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REPORT TO CONGRESS

THE IMPACT OF THE MEDICARE HOSPITAL PROSPECTIVE PAYMENT SYSTEM

1988 ANNUAL REPORT

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MEDICARE HOSPITAL PROSPECTIVE PAYMENT SYSTEM

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Executive Summary

The Social Security Amendments of 1983 and the Omnibus Budget Reconciliation Act of 1986 (OBRA 86) mandated a series of six annual reports on the impact of the Medicare Prospective Payment System (PPS). The reports are required to describe and assess the impact of PPS on beneficiaries, classes of hospitals, other providers, and other payers for inpatient hospital services. Special concern was expressed about post-hospital care.

This report is the fifth in the series and has the following objectives:

- provide an update on the status of PPS as of 1988;
- report on studies of PPS impact that have been completed since the fourth report was prepared.

The major source of data for this report is the Medicare statistical system. Additional sources of data for the PPS evaluation are provided by Health Care Financing Administration (HCFA)-supported contract and grant research activities. Finally, where appropriate, sources of data outside of HCFA and studies by organizations other than HCFA are used. These sources include other Federal Government sources, such as the Prospective Payment Assessment Commission, and sources in the private sector, such as the American Hospital Association (AHA).

Since the objective of this report is to describe and analyze the impact of PPS during its fifth year (fiscal year 1988), an attempt has been made to incorporate the most recent data available at the time that the analyses were conducted. For some of these analyses, data on fiscal year 1988 were available. In the absence of such data, fiscal year 1987 data were used. The next report will update these analyses, as the data permit. A synopsis of the report's findings follows.

<u>Program Trends</u>

1. Medicare benefit payments for inpatient hospital care increased by 6.5 percent in fiscal year 1988, in contrast to an increase of 3.0 percent in fiscal year 1987. This reversed the trend of declining rates of increase, which extends back to fiscal year 1981, but which has been more pronounced under PPS. Total benefit payments under Parts A

and B of the Medicare program increased by 9.4 percent, an increase from 7.6 percent in fiscal year 1987 and the highest rate of growth since fiscal year 1984. The difference between the high rate of growth of total benefit payments and inpatient hospital care benefit payments is largely attributable to rapid growth in hospital outpatient and physician payments, despite some slowing in these latter categories within the last 2 years.

2. Total days of inpatient care per 1,000 Medicare aged beneficiaries declined in 1987, continuing a trend from a peak in calendar year 1982. The discharge rate continued its decline from a peak in 1983 while length of stay increased for the first time in the 1980s. The cumulative effects are a 29 percent decrease in the days of care rate, a 21 percent decrease in the discharge rate, and a 10 percent decline in length of stay from 1983 to 1987. As reported in previous annual reports, changes in utilization rates do not appear to have disproportionately affected high risk age, sex, or race groups with potential access problems. The volume of hospital care may be beginning to stabilize, as shown by the modest 2.4 percent change in the days of care rate from 1986 to 1987.

3. Rural residents are admitted to hospitals more often, and for less resource intensive reasons, than their urban

counterparts. Reductions in length of stay and in admissions rates have resulted in lower days-of-care rates for rural beneficiaries. Rural beneficiaries are increasingly using urban hospitals; while in urban hospitals--on average--they incur higher charges, have longer stays, and are more likely to receive surgical procedures than rural beneficiaries going to rural hospitals.

Quality and Access

1. New evidence supports the finding presented in previous annual reports that implementation of the Medicare prospective payment system has not been associated with problems in the quality of care. A study by Systemetrics/McGraw Hill, extending work reported in the last annual report, accounted for essentially all of the increase in 30-day post-admission mortality between fiscal years 1984 and 1987 using a severity classification system based on the disease staging methodology which controls for disease category, stage of illness, high risk comorbidity, age and sex. A major HCFA-sponsored study of patients with five conditions by the RAND Corporation examined the impact of PPS on the quality of care of hospitalized Medicare patients. The evaluation collected data on a nationally representative sample of Medicare patients hospitalized in

1981-82 and 1985-86. Mortality rates 30 days after admission, adjusted for sickness at admission, fell from 16.7 percent pre-PPS to 15.7 percent post-PPS, a statistically significant decline, for the five diseases in the RAND evaluation. Overall, 180-day post-admission mortality stayed almost unchanged at just under 30 percent in both periods. However, the share of patients unstable at discharge increased with the number discharged to home increasing from 10.3 to 14.7 percent.

2. Analysis of episodes of illness associated with hospitalization, which extended work reported in the last annual report, examined patients with four tracer conditions. Using data on all Part A and Part B services used, it found that inflation-adjusted office-based physician payments in each episode increased while inflation-adjusted inpatient physician payments decreased for the 1981-1986 period.

3. Within episodes, the expected substitution of services around the period of hospitalization has occurred. From 1981 to 1986 use of Medicare services increased for all four tracer conditions in the post-discharge period, although there is less indication of change during the pre-admission period. The percentage of discharges receiving skilled nursing facility (SNF) or home health agency (HHA) services

in the first week post-discharge has increased substantially for all tracers, indicating a substitution of SNF and HHA care for recuperative days in the hospital in the period coincident with the implementation of PPS. Analysis of episodes of care for these tracers shows more post-stay substitution than pre-stay substitution.

Post-Hospital Care

1. Use of SNFs increased in 1988. As measured by the ratio of SNF admissions to inpatient hospital admissions, Medicare SNF utilization increased in 1988 after declining in 1987. Between 1987 and 1988 Medicare SNF length of stay increased after declining between 1981 and 1987. The number of persons served under the Medicare home health benefit increased slightly more than 2 percent between 1987-1988, in contrast to a slight decline between 1986-1987 and increases for the period immediately after PPS implementation. The growth in SNF admissions and length of stay can be attributed to a clarification of the definition of "skilled" level of nursing care in April 1988. Changes due to the Medicare Catastrophic Coverage Act of 1988, in effect throughout calendar year 1989, also affected payments during 1989.

2. The gap between urban and rural areas in use of SNF and HHA care shrank by half in the 1981-1986 period. The urban-rural gap in SNF utilization was cut by three-quarters over the same period. By various measures, home health use in PPS States grew more continuously in urban areas than it did in rural ones in the post-PPS period. SNF use in PPS States showed an earlier one-time increase in urban areas in the post-PPS period.

3. In a study by the University of Minnesota and the RAND Corporation, researchers examined cross section evidence on post-hospital care use by patients with five conditions in the year ending June 1985. After controlling for <u>the individual patient's</u> length of stay (which may reflect patient severity of illness), patients from hospitals with relatively short case mix-adjusted average lengths of stay were more likely to use post-hospital care than those from hospitals with longer average lengths of stay. In general, SNF care seems to substitute for hospital inpatient care while the evidence is ambiguous as to whether home health care and inpatient hospital care are substitutes or complements.

4. Section 9305 (i) of the Omnibus Budget Reconciliation Act of 1986 (OBRA 86) requires that information on Medicare reconsiderations and appeals with respect to payment for

post-hospital services be included in this report. The option of reconsideration and appeal is available to beneficiaries whose claims were denied. In FY 1989 approximately 10.5 percent of SNF claims were denied, compared to 22 percent in FY 1988. In FY 1989 there were 10,496 reconsideration requests, which comprised 6.2 percent of denied SNF claims and 0.7 percent of all SNF claims. Including submissions from the previous year, 10,385 requests were processed, of which 3,601 were reversed in whole or in part. There were 1,439 Administrative Law Judge cases completed, of which 795 were reversed in whole or in part. During FY 1989, approximately 3.0 percent of HHA claims were denied, compared to 3.6 percent in FY 1988. In FY 1989, there were 28,475 home health care cases submitted for reconsideration, which comprised approximately 17.6 percent of all HHA denials and 0.5 percent of all HHA claims. Including submissions from the previous year, a total of 28,804 cases were processed, of which 11,759 were reversed in whole or in part. In FY 1989, 7,499 hearings were completed with 5,074 reversed partially or fully.

Hospital Revenue and Margins

1. Hospital total expense per case for all payers grew at an increasing rate from 1984 to 1987, followed by somewhat

slower growth in 1988. Combined with steady but generally lower growth in revenue per case, total margins decreased from 6.2 percent in 1984 to 4.8 percent in 1988, according to American Hospital Association data. Despite these declines, hospital total margins remain at high levels compared to the pre-PPS period.

2. Average annual increases in revenue and cost per case have exceeded growth in the consumer price index (CPI) by over 5 percentage points in the 1963-1988 period. In particular, although growth rates of revenue and cost per case decreased between the 1978-1983 and the 1983-1988 periods (pre- to post-PPS), the <u>differential</u> between these growth rates and general economy-wide inflation <u>increased</u>. Hospital revenue and cost rose faster than the CPI by 4-4.5 percentage points in the 1978-1983 period and by 5 percentage points in the 1983-1988 period.

3. Increases in PPS cost and slower growth of PPS revenue have led to decreased PPS margins. PPS operating margins have declined from 14 percent in the first year of PPS (essentially 1984) to 2.4 percent in the fifth year (1988). In the first year PPS revenue per case increased 16 percent while cost per case increased only 2 percent. By the fifth year PPS cost per case increased 10 percent while revenue increased 6 percent.

4. Revenue growth reflected the level of the update factor and the Medicare case mix index (CMI). The update declined steadily from 5.9 percent in the first year to 0.5 percent in the third year and then increased to about 1.6 percent in the fifth year. The CMI increased approximately 2-4 percent per year from fiscal years 1985 through 1988. After growth of less than 2 percent in the first year of PPS cost per case has increased at approximately 9-10 percent annually through the fifth year.

5. PPS operating margins vary by hospital type. Urban hospital margins continued to be higher than rural margins, larger hospitals were more profitable than smaller hospitals, and higher occupancy hospitals had higher margins than lower occupancy hospitals in the fifth year of PPS. Major teaching hospital margins increased from the previous year to over 16 percent, reflecting low cost growth of 6 percent (compared to 10 percent for all hospitals), high occupancy rates of 76 percent (compared to 50 percent for all hospitals), and favorable discharge experience. The proportion of hospitals with negative margins continues to increase each year, as the overall PPS margin falls. About one-half of all PPS hospitals had negative margins in the fifth year of PPS.

6. Rural hospital margins averaged -2.43 percent (compared to an urban average of 2.97 percent) in the fifth year of PPS. Margins declined for all rural bed size categories. Rural occupancy rates continued to decline, falling to 36.2 percent in the fifth year (compared to 57.3 percent for urban hospitals). While PPS cost per case growth has been approximately the same for urban and rural hospitals since the second year of PPS (9-10 percent per year) PPS revenue per case has increased more rapidly for rural than urban hospitals in the fourth and fifth years.

7. As discussed in prior annual reports, there is considerable evidence that change in the PPS payment formula will not solve the problems of many rural hospitals. Today's rural hospital problems are not new and are due to factors such as declining utilization rather than purely locational factors. Multivariate analysis indicates that over the 1986-1988 period the percent change in inpatient admissions had the largest effect on the percent change in average operating costs.

Hospital Costs

1. Long-term sources of hospital cost increase include increasing intensity of care and increased labor input. In the post-PPS period increases in labor input, payroll per

full time equivalent employee, hospital skill mix (e.g., more registered nurses as a share of all nurses), and hospital compensation compared to economy-wide trends contribute to increases in cost. Several factors may have reduced cost control impact after the early PPS years: high PPS margins in the first years after implementation, strong first year and weaker second year PPS effects on hospital behavior, and lesser impact of fiscal pressure on costs after a hospital's first year on PPS. While little of the increase in the CMI represented real change at the start of PPS, about two-thirds of the 1986-1987 increase and between one-third and one-half of the 1987-1988 increase was real change.

2. The behavior of participants in health care markets provides some explanation of continuing hospital cost increases as well as identification of factors that may restrain cost growth. New evidence from HCFA-funded research (Hendricks, 1989a) and from independent studies (Robinson and Luft, 1987, 1988) supports the hypothesis that competition among hospitals tends to raise costs as measured in cross-sectional data. However, the evidence does not suggest that changes in either price or nonprice competition explain continuing cost increases over time. As discussed in previous annual reports, changes in private health insurance markets, employment of innovative organizational forms

(e.g., preferred provider organizations), and increasing use of cost containment techniques may tend to restrain hospital cost increases. Although the effectiveness of much of this activity is unproven, updates of HCFA-funded research indicate that PPS and Blue Cross plan cost containment policies have contained Blue Cross utilization and payments (Scheffler et al., 1989).

Hospital Closures

1. Discharge declines contributed to hospital closures in the post-PPS period. Hospital closures per year in States covered by PPS in 1984-1987 were 2.75 times the rate in the pre-PPS period 1980-1983. The increase in the number of closures during the post-PPS period was greatest among rural hospitals, where total closures increased 130 percent. However, only 1.7 percent of beds were lost due to closures of rural hospitals in the post-PPS period (versus 0.9 percent in the pre-PPS period). The majority of rural hospitals that close in PPS States (85 percent) are located in counties with other acute care hospitals. The number of urban closures also grew in the post-PPS period, with an increase of 68 percent over the pre-PPS period. However, only 1.0 percent of beds were lost due to closures of urban hospitals in the post-PPS period (versus 0.6 percent in the pre-PPS period.)

Capital

1. Since the outset of PPS, there has been concern that the cost pass-through for Medicare capital-related costs would encourage excessive increases in capital costs. This concern is reflected in Congressional action to reduce capital cost payments in OBRA 86 and OBRA 87. From the start of PPS through the program's fourth year aggregate hospital capital costs grew more rapidly than operating costs. In the fifth year this trend leveled off, with capital and operating costs increasing at approximately the same rate. Urban capital cost growth rates continued to exceed rural growth rates, as in the prior two years.

Outpatient Hospital Care

1. Outpatient care represents a progressively more important part of Medicare-covered hospital services. Total hospital outpatient Medicare benefit payments increased 18.1 percent per year in the 1984-1987 period (versus 5.0 percent per year for inpatient service benefit payments). Outpatient revenue accounts for a large and increasing share of the activity of many ancillary departments. Total emergency room visits by Medicare patients increased 6.1 percent in 1988 while total clinic visits increased 3.9 percent.

Chapter 1

Introduction

This is the fifth in a series of six annual reports by the Department of Health and Human Services (DHHS) to describe and assess the impact of the Medicare Hospital Prospective Payment System (PPS). PPS was enacted by the Congress in the Social Security Amendments of 1983 (Public Law 98-21). Section 603(a) of that legislation requires the Secretary of Health and Human Services to:

> "...study and report annually to the Congress at the end of each year (beginning with 1984 and ending with 1987) on the impact, of the payment methodology under Section 1886(d) of the Social Security Act during the previous year, on classes of hospitals, beneficiaries, and other payors for inpatient hospital services, and other providers, and, in particular, on the impact of computing DRG [diagnosis-related group] prospective

payment rates by census division, rather than exclusively on a national basis."

Each annual report is also to include recommendations for such changes in legislation as the Secretary deems appropriate.

In the Omnibus Budget Reconciliation Act of 1986 (OBRA 86)(Public Law 99-509), the Congress extended the mandate for the annual reports through 1989. Section 9305(i) of OBRA 86 requires that--beginning with the 1986 report--each annual report shall include:

"(i) an evaluation of the adequacy of the procedures for assuring quality of post-hospital services furnished under title XVIII of the Social Security Act,

(ii) an assessment of problems that have prevented groups of medicare beneficiaries (including those eligible for medical assistance under title XIX of such Act) from receiving appropriate post-hospital services covered under such title, and

(iii) information on reconsiderations and appeals taken under title XVIII of such Act with respect to payment for post-hospital services."

In response to this Congressional mandate, DHHS undertook a major effort to evaluate the new payment system. This evaluation

effort has been designed and implemented with the following objectives in mind:

- o to conduct a systematic evaluation of a policy change that has had a dramatic effect on the entire health care system;
- o to describe the behavioral changes occurring among the institutions and individuals that provide, use and pay for health care, particularly among Medicare providers and beneficiaries; and
- o to determine, to the extent possible, the degree to which PPS is responsible for the changes observed since its implementation.

The series of annual reports is based on this effort.

This fifth report has the following objectives:

- o provide an update on the status of PPS as of 1988, and
- o report on studies of PPS impact that have been completed since the fourth report was prepared.

The major source of data for this report is the Medicare statistical system. The Health Care Financing Administration (HCFA) collects a rich body of data associated with the utilization and cost of inpatient hospital services and other hospital and ambulatory care services covered by Medicare.

Additional sources of data are provided by HCFA-supported contract and grant research activities. These activities have also provided many of the analyses of the impact of PPS. Finally, where appropriate, sources of data outside of HCFA are used, including other Government sources and sources in the private sector, such as the American Hospital Association (AHA).

The findings in this report incorporate the most recent data available at the time that the analyses were conducted. For some of these analyses, data on fiscal year 1988 were available. In the absence of such data, fiscal year 1987 data were used.

The remainder of this introductory chapter reviews the status of PPS payment rules in fiscal year 1988 including changes in Medicare treatment of capital expenditures. It also updates trends in Medicare benefit payments by major service categories (inpatient hospital, outpatient hospital, physician services, and post-hospital care services.) This material provides a context for much of the discussion that follows.

The two chapters that follow describe the impact of PPS on Medicare beneficiaries and on the health care sector, respectively. Chapter 2 deals with PPS impact on Medicare beneficiaries, including post-hospital care issues. Chapter 3 discusses PPS impact on Medicare providers of inpatient and

outpatient hospital care as well as on other aspects of the health care sector. This report contains no information on the growth of physicians services and physician payments. These issues were addressed in detail in another DHHS report submitted to Congress on October 18, 1989, entitled Medicare Physician Payment: Volume and Intensity of Physician Services (DHHS, 1989).

PPS Payment Rules in Fiscal Year 1988

Beginning in fiscal year 1988, the Federal portion of the PPS payment rate was based entirely on the national rate, changing from a blend of 75 percent Federal/25 percent hospital specific portions which was in effect from October 1, 1986 through November 20, 1987. For fiscal year 1988 the Federal portion of the rate was updated in three steps by legislation. First, national rates were frozen--i.e, a zero percent update was provided--for the period October 1 through November 20, 1987 under the Balanced Budget and Emergency Deficit Control Reaffirmation Act of 1987 (P.L. 99-177). Second, a combination of an update of 2.7 percent in accordance with OBRA 86 and a reduction of 2.324 percent in accordance with Gramm-Rudman-Hollings led to a net update of approximately 0.4 percent for the period November 21, 1987 through March 31, 1988. Third, the Omnibus Budget Reconciliation Act of 1987 (OBRA 87, P.L. 100-

203) set three separate update rates:

1) 1.5 percent for hospitals in urban areas greater than one million (deemed to include Providence, RI),
2) 1.0 percent for other urban hospitals, and
3) 3.0 percent for hospitals in rural areas.

These differential updates were effective April 1, 1988.

Under the original PPS legislation, the full national payment rates were to become effective in fiscal year 1987. However, the Consolidated Omnibus Budget Reconciliation Act of 1985 (COBRA) (Public Law 99-272), delayed the transition by 1 year for all PPS hospitals except those in Oregon. Under the Balanced Budget and Emergency Deficit Control Reaffirmation Act of 1988 (P.L. 100-119), the implementation of the new payment rates for fiscal year 1988 was further delayed from October 1, 1987 to November 21, 1987. OBRA 87 also established a regional minimum payment amount (regional floor) for PPS hospitals effective April 1, 1988. Under the regional floor, a PPS hospital will be paid the greater amount of either the national rate or the sum of 85 percent of the national rate plus 15 percent of the regional PPS rate.

Effective with discharges on or after October 1, 1987, OBRA 86 also required that the 58 acute care hospitals located in urban and rural areas of Puerto Rico be included with the approximately

5,600 hospitals that were already operating under PPS. In addition, effective with cost reporting periods beginning on or after October 1, 1987, alcohol and drug abuse treatment hospitals and units that had been excluded from PPS began receiving Medicare prospective payment.

OBRA 87 included a number of provisions affecting PPS payments to rural hospitals. The Secretary of Health and Human Services is required to treat a hospital located in a rural county that is adjacent to one or more urban areas as being located in the urban Metropolitan Statistical Area (MSA) in which the greatest number of workers commute, provided certain specified conditions are met. The swing bed program for rural hospitals was expanded to include hospitals with less than 100 beds. Under prior law, the size limit was 50 beds. OBRA 87 also provided for a change in the bed size for hospitals to qualify as rural referral centers. Under prior law a hospital could qualify as a rural referral center if it had 500 or more beds and met certain criteria with regard to case mix index value and number of annual discharges. Beginning April 1, 1988, the new provision reduced the bed size of qualifying rural hospitals to 275 or more beds.

With respect to sole community hospitals, OBRA 87 extended the "volume adjustment" provision through cost reporting periods beginning before October 1, 1990. Under this provision,

hospitals that meet the criteria for sole community hospital status (and experience an annual decrease of 5 percent or more in total inpatient cases due to circumstances beyond their control) may receive the additional payment without seeking formal designation as a sole community hospital.

OBRA 87 reduced payments for capital costs by 7 percent between October 1, 1987 and December 31, 1987, and by 12 percent for the remainder of fiscal year 1988 (rather than the 7 percent reduction required under OBRA 86 for all of fiscal year 1988). Additional details of the capital payment provisions are discussed in Chapter 3.

Under PPS, hospitals receive an additional "outlier" payment for cases that have extraordinarily long lengths of stay or are extraordinarily costly in relation to other cases within a DRG. OBRA 87 increased the payment for outliers in burn DRGs from 60 percent to 90 percent of the per diem cost of care for day outliers or 90 percent of the cost for cost outliers, effective April 1, 1988. It required that total payment for burn outliers be administered in such a way that total PPS payments not be increased or decreased. It also prohibited the Secretary from issuing any final regulation that would change the method of payment for outlier cases before September 1, 1988.

In other respects PPS remained the same. Because of participation in State rate-setting systems, Maryland and New Jersey continued to be excluded from PPS. Member hospitals in the Finger Lakes Area Hospital Association, Inc. were also excluded from PPS and paid under a demonstration program. Other hospitals originally excluded from PPS (i.e., psychiatric, rehabilitation, children's and long term care hospitals) continued to be excluded in fiscal year 1988.

Medicare Benefit Payments

In fiscal year 1988, the rate of increase of total Medicare benefit payments was 9.4 percent, which was the largest increase since fiscal year 1984. This marks an upturn after the fiscal years 1984 through 1987, which saw the slowest growth since Medicare began. (See Table 1.1 for an overview of the estimated incurred Medicare benefit payments under both the Hospital Insurance and the Supplementary Medical Insurance Programs.) Beginning in fiscal year 1984, PPS helped to reduce the growth in Medicare benefit payments for inpatient hospital services, which account for about 60 percent of total benefit payments. Growth has only recently slowed, however, in two types of services that now comprise about 35 percent of total Medicare benefit payments: hospital outpatient and physician services. Tables 1.2 and 1.3 provide dollar and percentage distributions of incurred benefit

payments by type of provider from the beginning of the Medicare program through fiscal year 1988.

Inpatient Hospital Benefit Payments

The growth in inpatient hospital benefit payments began to accelerate again in fiscal year 1988, when the increase was 6.5 percent. This came after two of the smallest increases in the Medicare program's history: 3.9 percent in fiscal year 1986 and 3.0 percent in fiscal year 1987.

The percentage of total Medicare benefit payments accounted for by inpatient hospital services had begun falling before PPS-- from a peak of 70.1 percent in fiscal year 1972 and fiscal year 1973 to 65.2 percent in fiscal year 1983. After 5 years of PPS, the share of inpatient hospital payments was at an all-time low of 57.5 percent in fiscal year 1988.

Outpatient Hospital Benefit Payments

Outpatient hospital benefit payments grew from $25 million in fiscal year 1967 to over $6.8 billion in fiscal year 1988. In previous reports, we noted that outpatient hospital payments showed double-digit increases in every year since the beginning of the Medicare program. Fiscal year 1988 was no different, with

an increase of 13.6 percent. This is down from the two previous fiscal years, however, when each of the increases was nearly 20 percent. In the past, much of this increase was due to expansions in coverage for outpatient services as the Medicare program developed, such as inclusion of routine maintenance dialysis treatments in fiscal year 1974. Under PPS, with outpatient benefit payments growing more rapidly than Medicare benefits overall, their share of Medicare benefit payments has continued to increase--to 7.8 percent in fiscal year 1988. This contrasts with the beginning of the Medicare program in 1967, when the share of outpatient hospital payments was only 0.6 percent. If this steady trend continues, it will not be long before one dollar of every ten spent by the Medicare program will be for services rendered in the hospital outpatient setting.

Physician Benefit Payments

Physician services continue to be second only to inpatient hospital services in volume of Medicare benefit payments. As shown in Table 1.2, physician payments increased from $1.0 billion in fiscal year 1967 to $13.8 billion in fiscal year 1983. During the pre-PPS period, the compounded annual rate of increase was about 16 percent. The growth in incurred Medicare benefit payments for physician care slowed during fiscal years 1984 and 1985, but accelerated to 13 and 14 percent in

fiscal years 1986 and 1987, respectively. However, growth slowed again in fiscal year 1988, when the rate was 11.7 percent.

Skilled Nursing Benefit Payments

Skilled nursing payments account for a smaller share of total Medicare benefit payments than any other major component. Benefit payments for skilled nursing care have followed an irregular pattern of growth--rising and falling for 20 years. Since fiscal year 1978 the growth rates have all been single digit in size. In fiscal year 1988, however, the growth in estimated incurred benefit payments for skilled nursing care was 37.2 percent, compared to only 6 percent in fiscal year 1987. Chapter 2 contains a clarification of skilled facility coverage rules, which helps to explain this large increase in skilled nursing facility (SNF) benefit payments.

Home Health Benefit Payments

Home health benefit payments grew at annual rates of 20-30 percent in the early 1980s. Since fiscal year 1985, growth has slowed dramatically and in fiscal year 1987, payments declined 0.8 percent. In 1988, however, this trend was reversed with a growth rate of 7.4 percent.

Table 1.1

Estimated Incurred Medicare Benefit Payments
Under Hospital Insurance (HI) and Supplementary Medical Insurance (SMI)
FY 1967-88

	HI Payments		SMI Payments		Total Payments	
Fiscal Year	Amount	Percent Change	Amount	Percent Change	Amount	Percent Change
1967	2,897	----	1,109	----	4,006	----
1968	3,868	33.5	1,443	30.1	5,311	32.6
1969	4,675	20.9	1,750	21.3	6,425	21.0
1970	5,018	7.3	1,929	10.2	6,947	8.1
1971	5,623	12.1	2,090	8.3	7,713	11.0
1972	6,176	9.8	2,289	9.5	8,465	9.7
1973	6,787	9.9	2,500	9.2	9,287	9.7
1974	8,304	22.4	3,149	26.0	11,453	23.3
1975	10,381	25.0	3,928	24.7	14,309	24.9
1976	12,357	19.0	4,818	22.7	17,175	20.0
TQ*	3,307	----	1,465	----	4,772	----
1977	15,175	----	6,134	----	21,309	----
1978	17,549	15.6	7,254	18.3	24,803	16.4
1979	20,132	14.7	8,613	18.7	28,745	15.9
1980	24,268	20.5	10,469	21.5	34,737	20.8
1981	29,140	20.1	12,556	19.9	41,696	20.0
1982	34,524	18.5	14,811	18.0	49,335	18.3
1983	39,372	14.0	17,670	19.3	57,042	15.6
1984	43,173	9.7	19,881	12.5	63,054	10.5
1985	46,645	8.0	21,985	10.6	68,630	8.8
1986	48,446	3.9	25,501	16.0	73,947	7.7
1987	49,879	3.0	29,693	16.4	79,572	7.6
1988	53,359	7.0	33,725	13.6	87,084	9.4

*Transitional quarter to adjust for change in start of Federal fiscal year from July 1 to October 1 in 1976.

Note: Amounts in millions of dollars.

Source: Health Care Financing Administration, Office of the Actuary.

Table 1.2

Estimated Incurred Medicare Benefit Payments By Type of Provider
FY 1967-88

Fiscal Year	Inpatient Hospital		Outpatient Hospital[1/]		Physicians[2/]		Skilled Nursing		HHA[3/]		(HI) Hospice
	Amount	Percent Change	Amount	Percent Change	Amount	Percent Change	Amount	Percent Change	Amount	Percent Change	Amount
1967	2,729	----	25	----	1,049	----	147	----	34	----	
1968	3,464	26.9	43	72.0	1,343	28.0	361	145.6	69	102.9	
1969	4,200	21.2	79	83.7	1,598	19.0	416	15.2	94	36.2	
1970	4,663	11.0	114	44.3	1,739	8.8	294	-29.3	99	5.3	
1971	5,355	14.8	148	29.8	1,869	7.5	216	-26.5	85	-14.1	
1972	5,937	10.9	171	15.5	2,037	9.0	180	-16.7	91	7.1	
1973	6,513	9.7	193	12.9	2,206	8.3	203	12.8	116	27.5	
1974	7,945	22.0	381	97.4	2,641	19.7	255	25.6	152	31.0	
1975	9,943	25.1	538	41.2	3,194	20.9	280	9.8	245	61.2	
1976	11,808	18.8	751	39.6	3,802	19.0	318	13.6	356	45.3	
TQ*	3,153	----	256	----	1,128	----	87	----	107	----	
1977	14,508	----	1,076	----	4,725	----	352	----	476	----	
1978	16,813	15.9	1,299	20.7	5,595	18.4	352	0.0	555	16.6	
1979	19,299	14.8	1,576	21.3	6,619	18.3	366	4.0	649	16.9	
1980	23,290	20.7	1,890	19.9	8,049	21.6	401	9.6	782	20.5	
1981	27,891	19.8	2,277	20.5	9,690	20.4	439	9.5	976	24.8	
1982	32,769	17.5	2,703	18.7	11,578	19.5	477	8.7	1,293	32.5	
1983	37,187	13.5	3,188	17.9	13,826	19.4	521	9.2	1,686	30.4	
1984	40,622	9.2	3,644	14.3	15,400	11.4	550	5.6	2,026	20.2	2
1985	43,881	8.0	4,178	14.7	16,646	8.1	572	4.0	2,206	8.9	15
1986	45,614	3.9	5,009	19.9	18,804	13.0	580	1.4	2,249	1.9	35
1987	47,002	3.0	5,998	19.7	21,467	14.2	615	6.0	2,230	-0.8	63
1988	50,076	6.5	6,812	13.6	23,986	11.7	844	37.2	2,396	7.4	90

1/ Includes payments for routine maintenance dialysis treatments since FY 1974.

2/ Includes payments for inpatient radiology and pathology services, as well as durable medical equipment, ambulance, and several other non-physician services covered under Medicare Supplementary Medical Insurance.

3/ Includes payments under both Medicare Hospital Insurance and Supplementary Medical Insurance.

* Transitional quarter to adjust for change in start of Federal fiscal year from July 1 to October 1 in 1976.

Note: Payments on an incurred basis by type of provider are estimated and subject to change as more recent and complete data become available and estimates are revised. Amounts in millions of dollars.

Source: Health Care Financing Administration, Office of the Actuary.

Table 1.3

Distribution of Estimated Incurred Medicare Benefit Payments
By Type of Provider
FY 1967-88

Fiscal Year	Inpatient Hospital	Outpatient Hospital	Physicians	Skilled Nursing	HHA	Other[1]
1967	68.1%	0.6%	26.2%	3.7%	0.8%	0.5%
1968	65.2	0.8	25.3	6.8	1.3	0.6
1969	65.4	1.2	24.9	6.5	1.5	0.6
1970	67.1	1.6	25.0	4.2	1.4	0.5
1971	69.4	1.9	24.2	2.8	1.1	0.5
1972	70.1	2.0	24.1	2.1	1.1	0.6
1973	70.1	2.1	23.8	2.2	1.2	0.6
1974	69.4	3.3	23.1	2.2	1.3	0.7
1975	69.5	3.8	22.3	2.0	1.7	0.8
1976	68.8	4.4	22.1	1.9	2.1	0.8
TQ*	66.1	5.4	23.6	1.8	2.2	0.9
1977	68.1	5.0	22.2	1.7	2.2	0.8
1978	67.8	5.2	22.6	1.4	2.2	0.8
1979	67.1	5.5	23.0	1.3	2.3	0.8
1980	67.0	5.4	23.2	1.2	2.3	0.9
1981	66.9	5.5	23.2	1.1	2.3	1.0
1982	66.4	5.5	23.5	1.0	2.6	1.0
1983	65.2	5.6	24.2	0.9	3.0	1.1
1984	64.4	5.8	24.4	0.9	3.2	1.3
1985	63.9	6.1	24.3	0.8	3.2	1.7
1986	61.7	6.8	25.4	0.8	3.0	2.3
1987	59.1	7.5	27.0	0.8	2.8	2.8
1988	57.5	7.8	27.5	1.0	2.8	3.4

1/ Includes Independent Laboratories, Group Practice Prepayment Plans and Hospice.

* Transitional quarter to adjust for change in start of Federal fiscal year from July 1 to October 1 in 1976.

Source: Health Care Financing Administration, Office of the Actuary.

Chapter 2

Impact on Medicare Beneficiaries

Among the major objectives of the Medicare program under PPS are assurance of continued access to appropriate health care by Medicare beneficiaries and the maintenance of the quality of care provided to these beneficiaries. This is of particular concern under a payment system such as PPS where the financial incentives to hospitals may encourage parsimonious use of services during a hospital stay. Lower levels of utilization need not, however, translate into concerns of over access and quality. Indeed, the incentives under PPS may serve to encourage improvements in access and quality. For instance, improved hospital management, increased specialization of services, and elimination of unnecessary services may result in the increased effectiveness of care.

Previous reports in this series have documented the sharp decline in hospital utilization in the first years after implementation of PPS and have presented evidence that these declines did not adversely affect high risk age, sex, or race groups. In the 1986

and 1987 reports we reported analyses indicating that outcomes of care as measured by 30-day post-admission mortality were not adversely affected by PPS after adjustment for severity of illness. We documented the increasing use of post-hospital care services by Medicare beneficiaries in the period coincident with the implementation of PPS and reported a narrowing gap between utilization by rural and urban beneficiaries.

This chapter updates this information and presents basic trend data on the utilization of short-stay hospital care by the Medicare population including data through calendar year 1987, the last year for which complete Medicare claims data is available. We report on research on impacts on vulnerable groups, in particular rural beneficiaries and those in their last months of life. We then summarize an analytical study of PPS impact on mortality and review the results of a major study of the impact of PPS on quality of care. We review new results from analyses of episodes of illness. Finally, we review data and studies on post-hospital care. We present evidence on a widespread substitution of nonhospital and especially post-hospital care for acute care in the period coincident with the implementation of PPS.

Beneficiary Access and Utilization

This section provides basic descriptive data on hospitalization rates for the elderly, the disabled, and the end stage renal disease (ESRD) Medicare populations. The variables of interest include the discharge rate (number of discharges per 1,000 enrolled persons), average length of stay, and the days of care rate (number of days of care per 1,000 enrolled persons). In addition, data are presented on a diagnosis related group (DRG) specific basis for the aged. Details of the methods used in this section can be found in our 1986 report in this series (DHHS, 1987).

Medicare's Aged Population

Previous years' analyses focused on trend comparisons between States operating under PPS and States operating under waivers of PPS (New York, Massachusetts, Maryland, and New Jersey). Since by 1988 both New York and Massachusetts had entered the national PPS, we decided to discontinue the PPS/non-PPS comparisons and examine national trends for the Medicare program as a whole.

Discharge Rate: Table 2.1 shows Medicare utilization for persons 65 years of age and over for the years 1980 through 1987. From 1980 through 1983, the discharge rate in the U.S. increased from 371 per 1,000 beneficiaries to 394 per 1,000, an average annual

increase of 2.1 percent. This was a continuation of the trend that has been observed since 1968. In 1984, the discharge rate declined (by 1.8 percent) for the first time since the beginning of Medicare. The decline continued for each of the following years through 1987; 8.5 percent in 1985, 7.3 percent in 1986, and 4.6 in 1987. By 1987 the U.S. discharge rate was 313 per 1,000, a net decrease of 20.8 percent from 1983.

We discussed reasons for these declines in our 1987 report. First, admission screening by Peer Review Organizations (PROs) reduced inappropriate admissions. Second, the increasing frequency of ambulatory surgery such as lens extractions has reduced admissions (DHHS, forthcoming; Gaumer et al.).

Length of Stay: There was a very large decline in length of stay during the first year of PPS. In contrast to the trend in discharge rates, average length of stay had been steadily declining prior to the start of PPS--in fact, since the beginning of the Medicare program. From 1980 through 1983, average length of stay declined from 10.3 days to 9.6 days, an average annual decline of 2.3 percent. In 1984, the decline was 0.9 days, or 8.8 percent. Length of stay continued to decline in 1985, but at a greatly diminished rate, falling from 8.7 days to 8.4 days, a decrease of 3.9 percent. However, length of stay plateaued in 1986, remaining at 8.4 days. In 1987, length of stay increased

to 8.6 days. Since the beginning of PPS through 1987, the total decline in length of stay has been 10.0 percent.

Days of Care: The product of the discharge rate and the average length of stay is the total days of care rate. This rate had not changed much for the Medicare aged population during the 15 years prior to the advent of PPS because the rate at which discharges had been rising was offset by an almost equal rate of decline in the average length of stay. In 1984, however, the combination of a large decline in length of stay and the first-ever decline in discharges resulted in a 10.6 percent decline in the days of care rate. The decrease in the days of care rate was somewhat larger in 1985 (12.0 percent). Although days of care continued to decline in 1986 and 1987, the rate of decrease (7.0 and 2.4 percent, respectively) was much less than in the previous 2 years. Still, the net impact has been significant. The days of care rate for Medicare aged beneficiaries was 28.7 percent lower in 1987 than in 1983.

Impact by Demographic Group: A major concern has been whether any changes in utilization rates fell disproportionately on high risk age, sex, and race groups with potential access problems. As shown in Table 2.1, however, declines in discharge rates since the introduction of PPS have been greater for younger persons than for older persons and greater for white beneficiaries than for persons of other races. Females have had a slightly larger

decrease in the discharge rate (21.7 percent) than have males (19.5 percent) even though they had a lower discharge rate in 1983. The reason for this is not clear. Because men and women have different patterns of admission, changes in overall discharge rates could affect them differentially. For instance, hospitalization for lens extraction was more common for females (19.5 per 1,000) than for males (14.3 per 1,000) in 1983. Thus, the movement of this procedure to outpatient settings had a larger impact on the total discharge rate for females than for males. To determine whether a change in the total discharge rate represents an access issue requires analyses of diagnosis-specific discharge rates. We present evidence on such changes below.

Length of stay is directly related to the age of the patient. Through 1985 there was a trend toward a narrowing of the age differential. This was reversed in the following 2 years. Length of stay remained at 7.7 days for persons ages 65 to 74 from 1985 through 1987 while increasing by 0.4 days for the two oldest age groups.

Due to the similarities of changes in discharge rates and lengths of stay, all population subgroups experienced similar decreases in days of care from 1983 to 1987, ranging from a 25.3 percent decrease for persons ages 85 and over to a 33.7 percent decrease for persons ages 65 to 69.

In summary, the data indicate that there has been little change in <u>relative</u> utilization levels across age, sex, or race categories. If the reductions in the discharge rate and length of stay represent decreased access, these decreases have been relatively evenly distributed across demographic categories. Similarly, to the extent that these reductions represent decreases in overuse, they have been experienced similarly by most demographic groups. In addition, it appears that the volume of hospital care is beginning to stabilize, as shown by the modest 2.4 percent change in the days of care rate from 1986 to 1987.

<u>DRG-Specific Utilization Rates</u>

As described in our 1986 report in this series, changes in DRG-specific utilization rates in the first year of PPS were quite large and generally believed to reflect, to a great extent, changes in coding practices (DHHS, 1987). Consequently, only the changes that have taken place since 1984 are examined for DRG-specific discharge rates and average lengths of stay.

Discharge rates per 1,000 beneficiaries are shown in Table 2.2 for 1984 through 1987 for the 20 DRG combinations that had the highest rates nationwide in 1984. These groups account for almost one-half of all Medicare admissions among the elderly. Fourteen of these groups decreased in frequency from 1984 to

1987. The exceptions were angina (7.1 percent increase), bronchitis (0.2 percent increase), prostatectomy (5.6 percent increase), nutritional and miscellaneous metabolic disorders (18.6 percent), major joint procedures (15.8 percent), and kidney infections (3.6 percent). The largest decreases were for lens procedures (93.9 percent) and atherosclerosis (83.1 percent). In the 1987 report we reported increases and decreases for essentially the same conditions through 1986 (DHHS, 1990).

Changes in length of stay are shown in Table 2.3 for the 20 DRG combinations with the longest lengths of stay in 1984 (only 4 of which are also included among the most common DRG combinations in Table 2.2). Eight of these DRGs had cumulative decreases of greater than 10 percent through 1987 with the greatest decreases for vascular procedures except major reconstruction (32.6 percent decrease), fracture of the hip/pelvis (20.1 percent), major joint procedures (18.6 percent), and hip/femur procedures (16.2 percent). Five of these DRGs have experienced increases since 1984 -- psychoses, stomach, esophageal, and duodenal procedures, degenerative nervous system disorders, lymphoma or leukemia, and organic disturbances and mental retardation. The relative stability of length of stay for some of these categories does not rule out large decreases between 1983 and 1984. However, the significant coding changes beginning in 1984 make analyses of pre/post-DRG changes uncertain at best. The results are similar to those reported in last year's report for 1986.

Medicare's Disabled Population

Table 2.4 shows utilization for disabled Medicare beneficiaries from 1980 through 1987. In the 4 years since PPS implementation, discharge rates have decreased by 6.4 percent, 4.2 percent, 3.6 percent, and 7.4 percent, respectively, for a total decrease of 19.7 percent between 1983 and 1987. Average length of stay for the disabled population declined in 1984 (8.2 percent) and in 1985 (3.0 percent). Between 1985 and 1987 there was a small increase in length of stay of 0.1 day. The total decrease in length of stay since the beginning of PPS is 9.7 percent. These trends are very similar to the declines in discharge rates and length of stay for the aged. Total days of care per 1,000 dropped by 27.6 percent for the disabled compared to the 28.7 percent decrease for the aged.

As with the aged, there were no striking differences in hospitalization changes across population subgroups. All experienced decreases in discharge rates (ranging from 10.3 percent to 20.1 percent), length of stay (ranging from a 4.2 percent to 12.3 percent), and total days of care (ranging from 16.0 percent to 28.9 percent).

Medicare's ESRD Population

Table 2.5 shows hospital utilization for the Medicare ESRD population on dialysis. Unlike the aged and disabled populations, discharge rates for the ESRD population have remained relatively unchanged since the advent of PPS, increasing steadily from 1,206 per 1,000 in 1983 to 1,303 per 1,000 in 1987. Rates decreased for persons under age 15 (most likely due to erroneous inclusion of some transplant cases in the earlier years) and increased markedly for persons over age 65. The increase among the aged is probably due to the expansion of dialysis (in recent years) to sicker patients who would have not been considered good candidates for dialysis previously. Length of stay trends were similar to those of the aged and disabled, a large decrease (11.5 percent) in 1984, followed by a smaller decrease (2.3 percent) in 1985. Lengths of stay increased by 4.7 percent in 1986 and by 4.4 percent in 1987. The increased discharge rates have largely offset the decreased lengths of stay. Therefore, unlike the aged and disabled populations, where the number of hospital days per 1,000 persons has decreased by nearly 30 percent, days of care rates among the ESRD population are down by less than 10 percent for most age groups, up by almost 10 percent among those over age 65, and up slightly overall.

Impacts on Vulnerable Groups

In light of the declines in Medicare hospital utilization discussed above, there has been concern since the advent of PPS that the new payment system might generate problems in access to care for Medicare beneficiaries. In this section we consider evidence on this issue. First, we examine data on episodes of care involving hospitalization for four tracer conditions. These data reflect nonhospital as well as hospital services consumed. Our 1987 report used these data principally to analyze the changing level and composition of total episode costs. We use the data here to further examine substitution of outpatient for inpatient care and the experiences of rural beneficiaries. We then consider information on the sources and composition of change in utilization by rural beneficiaries, a group which has shown a decline in inpatient days per enrollee. Finally, we look at data on episodes of care involving death to understand changes since the implementation of PPS in utilization by beneficiaries in this sensitive group.

Episodes of Care Involving Hospitalization

An episode of care involving hospitalization is defined here to be a period encompassing the time preceding, during, and

following an acute inpatient stay. Analytical files were constructed by Abt Associates under contract to HCFA using 1981-1986 Medicare administrative data for four tracer conditions: hip replacement, stroke, hernia repair, and pneumonia (Gaumer, 1990). All Part A and Part B services consumed during the window of time surrounding the stay--in this case, from 60 days prior to hospitalization to 60 days after discharge from the hospital--are treated as being associated with the target hospital stay. These files were used to analyze how PPS and other influences on utilization of covered Medicare services have altered the pattern of practice for episodes of care involving hospitalization in the 1980s.

In our 1987 report we measured the rate of growth of total episode cost, developed evidence of the increasing role of non-hospital and post-hospital care, showed some substitution of post-hospital for acute hospital care, and demonstrated that the inpatient stay still accounted for the bulk of episode costs (DHHS, 1990). We discuss here the changing composition of services delivered to Medicare beneficiaries and the implication of these changes for access to care for two groups--rural beneficiaries and those in their last months of life.

Services Delivered to Beneficiaries

As we discussed in last year's report, the data on episodes of care provide evidence of substitution of outpatient for inpatient care during the period coincident with the implementation of PPS. While this substitution may reduce the growth of total costs it also may reduce the impact of the incentives for efficient production in the fixed price PPS system. In particular, utilization of some Part B services has expanded while use of others has not (see Table 2.6). Across all four conditions studied, office-based physician reimbursements in the period from 30 days pre-stay to 30 days post-stay are increasing, on an annual basis, faster than the medical care price index. In contrast, inpatient physician payments are increasing more slowly than the medical care price index.

As we showed in last year's report and examine further in our discussion of post-hospital care below, PPS incentives to reduce length of stay appear to have had the expected effect and led to substitution of post-hospital for hospital services within episodes. Table 2.6 shows significant reductions in length of stay and more frequent use of Medicare services in the post-discharge period across all tracers. There is substantially less indication of changes in utilization of services during the pre-admission period.

The decision to discharge involves a choice between keeping all patients for longer periods to avoid complications for a few cases and discharging all patients earlier, thereby reducing length of stay, knowing that some will develop complications and need to be rehospitalized. The lower lengths of stay and higher readmission rates across all tracers suggest that hospitals judge the risks of early discharge to be acceptable but occasionally encounter adverse outcomes. Whether or not this behavior is resulting in lower quality care cannot be determined from these analyses but was addressed in the RAND quality of care study discussed below.

Access to Care for Rural Beneficiaries

Analysis of a random sample of episodes, not just tracer conditions, shows that there are substantial differences in hospital episodes for urban and rural beneficiaries (see Table 2.7). Most notably, rural beneficiaries continue to use about a day less of hospital care per episode. The reduction in days of care per episode and the increase in rehospitalization rates are about the same for both types of beneficiaries.

In contrast, rural beneficiaries are rapidly expanding their use of home health agency (HHA) and SNF services, significantly outpacing the rapid growth of these services among urban beneficiaries. As discussed in last year's report, for patients

with the four tracer conditions the likelihood of getting SNF or HHA care within 7 days of discharge is highest for urban beneficiaries receiving care in urban hospitals and less for rural beneficiaries using urban or rural hospitals. However, rural beneficiaries using urban hospitals are closing the gap with their urban counterparts.

Rural Beneficiaries: Sources and Composition of Utilization Change

Although health care access for the rural Medicare population has generally improved in the 20 years since the implementation of the program, the closure of 156 rural hospitals between 1980 and 1987 has raised concerns that these gains may be lost (Hendricks and Alberts, 1989a). During the 1980s, the admission rate for beneficiaries living in rural areas (in contrast to the rate for rural hospitals) dropped much more sharply than the urban admission rate (see Table 2.8). The decline in overall admissions, and particularly among rural beneficiaries, occurred mainly in 1985. Econometric analysis suggests that stiffer admissions controls as a result of initiation of PRO operations in 1985 may have had a greater effect among rural beneficiaries because of their larger proportion of less intensive admissions (Gaumer, 1989).

Rural residents are admitted to hospitals more often, and for less resource intensive reasons, than their urban counterparts. Rural beneficiaries have, on average, a DRG weight that is 3-5 percent less than that for urban beneficiaries (Gaumer, 1989). The combination of reductions in length of stay and in admission rates has resulted in lower days-of-care rates for rural beneficiaries. In 1981, Medicare inpatient days per enrollee were higher for rural than for urban beneficiaries (see Table 2.8). By 1986, the rural days-of-care per enrollee rate had dropped to below the urban days-of-care rate (Gaumer, 1989).

For whatever reasons, whether it be perceived differences in quality or the need for specialized services, rural beneficiaries often travel some distance to urban hospitals for medical care. Since 1984, both for initial admissions and for transfer situations, rural beneficiaries are increasingly using urban hospitals (Gaumer, 1989). HCFA administrative data indicate that, between 1984 and 1987, rural hospitals lost approximately 4 percent of their annual Medicare discharges to urban hospitals. Rural beneficiaries going to urban hospitals incur, on average, higher charges, have longer stays, and are more likely to receive a surgical procedure than rural beneficiaries going to rural hospitals (see Table 2.9). A recent analysis of the difference in standardized average costs per admission between rural and urban areas found that 25-50 percent of the difference resulted

from differences in procedure intensity for basically similar patients (Cromwell et al., 1987). This suggests that a rural beneficiary will receive more aggressive treatment by bypassing his or her local facility and traveling to an urban hospital.

A recent study sponsored by the Prospective Payment Assessment Commission (ProPAC) employing small area analysis of changes in Medicare admissions in five States suggests that hospital utilization patterns of Medicare beneficiaries in rural areas are becoming more like those of urban beneficiaries in terms of utilization rates and clinical services received (Codman, 1990). To compare clinical services received by urban and rural residents, the study uses a typology of admissions that classifies services along two dimensions: whether beneficiaries tend to use a local or referral hospital for a specific admission and whether a strong consensus exists among clinicians on the need for hospitalization for treatment of the condition. Table 2.10, taken from the Codman study, presents changes between 1984 and 1986 in admission rates for urban and rural beneficiaries for the different types of admissions. The largest decreases in Medicare admission rates occurred among high volume medical conditions for which there is relatively weak consensus on the need for hospitalization, with a greater decrease in rural than in urban areas. Admission rates for conditions and procedures for which physicians have a strong consensus on the need for hospitalization, described as low variation conditions, show far

less variation both over time and between urban and rural residents. The use of technology intensive treatments by rural beneficiaries has increased relative to urban beneficiaries. This is consistent with the increased use of urban hospitals by rural beneficiaries. While it is not known whether utilization patterns of urban beneficiaries are more appropriate than those of rural beneficiaries, the study concludes that the convergence of admission rates for all types of services implies more equitable access (Codman, 1990).

Access to Care for Dying Beneficiaries

Due to intensive use of health services and the strong interest of policymakers in providing access to care in the period prior to death, HCFA funded Abt Associates to examine changes in Medicare use during the last 90 days of life. Abt Associates construct analytic files based upon a random sample of 8,000 deaths per year for 1982-1986. An episode involving death is simply defined as a period of illness preceding death, whether or not it entails an inpatient stay. Changes in the use of Medicare-covered services over this period led to a decrease in the proportion of deaths occurring in hospitals from about 51 percent in 1982 to 45 percent in 1986 (see Table 2.11). Consistent with the sharper decline in days of care per hospital stay for rural beneficiaries, the reduction in in-hospital deaths

was largest among rural beneficiaries. While overall hospital admission rates among Medicare patients fell over the period, access to care for dying beneficiaries does not appear to have been seriously impacted. Although the last 90 days of life involved fewer days of inpatient care, hospital admission rates and general access to covered services (physician, durable medical equipment, and home care services) did not decline. The frequency of death preceded by <u>no</u> Medicare use is often used as a marker for poor access. In fact, the rate of death preceded by no Part A or Part B services during the last 90 days of life has generally declined.

Mortality

The discussion above has addressed the impact of PPS on access to hospital care. Of greater concern to policymakers and beneficiaries is the impact of PPS on medical outcomes of hospital care. In this and the following section we discuss evidence on the impact of PPS on hospital-related mortality and other important outcomes.

The first analysis of mortality included in this year's report is based on 30-day post-admission mortality and is an extension of last year's severity adjusted mortality analysis. There are inherent problems in analyzing hospital-related mortality.

Foremost among these is the problem of variations in case mix. Hospitalized patients, by definition, represent a highly selective group of persons. The decision to hospitalize a patient is based on a variety of factors, including individual physician practice patterns, practice patterns within the specific geographical area, patient preference, payment incentives, and, more recently, oversight functions of PROs. All of these factors, in addition to the basic condition of the patient, influence the hospitalization decision.

As described in the discussion of access and utilization above, there has been an unprecedented decrease in Medicare discharge rates since the advent of PPS. To the extent that these decreases occurred among categories of patients who are less severely ill, and thus at low risk of dying, the resulting pool of hospitalized patients is, on average, more severely ill, and consequently, at greater risk of death. Therefore, it is important that any analysis of trends in hospital-related mortality address the issue of changing case mix.

The decline in admissions may have resulted in <u>intra-diagnostic</u>, as well as <u>inter-diagnostic</u>, changes in severity. We examined this hypothesis using 1986 data in our last report using the computerized disease staging methodology developed by Systemetrics/McGraw Hill (Gonnella, 1987). Disease staging was developed for the purpose of measuring severity of disease in

terms of likelihood of death or residual impairment and can be applied using information from the Medicare Provider Analysis and Review (MedPAR) data set without additional medical record abstraction. The analysis below is an extension of last year's analysis of 1987 data.

The primary objective of this analysis is to determine whether or not there has been a change in 30-day post-admission mortality from 1984 to 1987 among Medicare patients, after adjusting for changes in case mix severity. A total of 819 homogenous risk groups have been developed, which account for differential mortality risk based on disease, stage of disease, presence of high risk comorbidity, age, and sex. These groups are roughly analogous to the DRG groupings used for payment. That is, just as the DRGs are representative of groups of patients for whom costs are relatively similar, the 819 groupings in this analysis are groupings of patients for whom the probability of death within 30 days of admission is similar.

A comparison of fiscal year 1987 Medicare hospital mortality rates with expected mortality rates based on the severity adjustment procedure described above is presented in Table 2.12. The table shows total discharges, actual percent dead, expected percent dead (based on 1984 mortality rates), and the standardized mortality ratio (SMR) for each of the 31 high mortality diseases and the four groups of low mortality diseases.

The SMR is the ratio of the actual mortality to the expected mortality. Ratios less than 1.0 represent cases in which the actual mortality is less than would have been expected, given the fiscal year 1987 severity levels, and ratios greater than 1.0 represent cases in which the actual mortality is greater than would have been expected, given the fiscal year 1987 severity levels.

Of the 35 disease groupings, there were 22 in which the SMR was less than 1.0, 12 in which the SMR was greater than 1.0, and 1 in which the SMR was equal to 1.0. The lowest SMR (0.66) was for other general conditions (an actual mortality rate of 3.0 percent versus an expected rate of 4.5 percent) and the highest SMR (1.29) was for the residual group of 350 diseases that had been grouped solely on the basis of 16 body systems (an actual mortality rate of 2.6 percent versus an expected rate of 2.0 percent).

Overall, the severity classification system accounted for essentially all of the increase in mortality between fiscal years 1984 and 1987. The mortality rate for 1984 was 6.6 percent, so, all things being equal, the expected mortality rate for 1987 would also have been 6.6 percent, considerably below the observed 1987 rate of 7.6 percent. Controlling for disease category, stage of illness, high risk comorbidity, age, and sex resulted in

an expected mortality rate for fiscal year 1986 of 7.7 percent, slightly higher than the observed rate of 7.6 percent.

There are two limitations to this analysis that must be considered. First, there is the possibility that much of the observed increase in stage of illness and comorbidities is due to coding or "DRG creep." A study by Carter and Ginsburg (1985) showed that there was an initial increase in case mix (as measured by the case mix index, or CMI), which was largely due to coding practice changes. The CMI continued to increase through fiscal year 1985, but less of that change could be attributed to coding practices (Carter and Ginsburg, 1986). Recent research shows a small portion of CMI increase to be due to coding change (Carter <u>et al</u>., 1989). Still, coding creep remains as a possible explanation for some of the observed increase in severity. This problem is not unique to this study but is relevant to any analysis of hospitalization data that uses case mix adjustment techniques based on diagnostic codes.

Second, the computerized staging method used in this analysis relies, of necessity, on the information available on the MedPAR files. As such, it permits a limited characterization of severity of illness. The principal diagnosis reflects the cause of the admission. The remaining secondary diagnoses (up to four) include conditions present at admission as well as conditions and complications encountered during the stay itself. It is not

possible, using these data, to clearly differentiate between conditions present at admission and conditions arising as a result of the stay itself. Although an attempt was made to eliminate severity that could have been caused by the stay, when possible (particularly for unrelated comorbidities), it is conceivable that some of the measured increase in severity could have been caused by the care provided rather than the condition of the patients on admission.

The RAND Quality of Care Study

Since 1985 HCFA-sponsored research at the RAND Corporation has examined the impact of the implementation of PPS on the quality of care of hospitalized Medicare patients. The evaluation collected data on a nationally representative sample of 14,012 Medicare patients hospitalized in 1981-82 and 1985-86 with any of five common conditions: congestive heart failure (CHF), acute myocardial infarction (AMI), pneumonia, cerebrovascular accident, and hip fracture. These conditions accounted for 19 percent of Medicare discharges and 32 percent of deaths within 30 days of admission in fiscal year 1986. The evaluation developed measures of sickness at admission, examined process of care measures, studied patient condition at discharge, and assessed the effect of PPS on several outcome measures.

The analyses developed disease-specific measures of sickness at admission which were based on clinical measures from the medical record and which are correlated with mortality (Keeler et al., 1990). Examination of these measures confirmed the widespread belief that severity of illness of Medicare inpatients has increased since implementation of PPS, at least for the conditions studied.

One measure of the quality of care is the nature of the process of care provided to patients. This measure of quality has greater validity when it can be shown that process is associated with outcome. The RAND study developed disease-specific explicit process scales measuring five attributes of the process of care: physician diagnostic cognitive, nurse diagnostic cognitive, technical diagnostic, technical therapeutic, and monitoring with ICU or telemetry. It also developed an overall process scale (Kahn et al., 1990b). Except for hip fracture, better process was associated with lower 30-day post-admission mortality rates. Improvements that occurred in process of care from the pre-PPS to the post-PPS periods were associated with expected reductions in 30-day and 180-day mortality for all diseases except hip fracture (i.e., for all medical conditions but not for the surgical condition studied).

A concern often raised after the introduction of PPS has been that many patients are prematurely discharged with resulting

adverse outcomes. The RAND evaluation examined evidence that patients were discharged "quicker and sicker" in its sample (Kosecoff et al., 1990). The evaluation identified three ways of measuring impairment: instability at discharge, sickness at discharge, and abnormal last laboratory value. The study focused on measures of instability at discharge which identify "clinical problems that first occurred prior to discharge and were not present at admission." After determining that instability is not a proxy for measures of sickness at admission or process of care, the researchers determined that it is highly predictive of mortality. In the sample studied, instability at discharge increased from 15.0 percent pre-PPS to 18.3 percent post-PPS. Although institutions such as nursing homes did not receive a significantly larger number of unstable patients after PPS, patients discharged to home were substantially more unstable, with an increase from 10.3 percent to 14.7 percent.

The evidence of greater instability at discharge does not, however, provide evidence of poorer outcomes in terms of overall mortality since it provides no information about the condition of stable patients--whether they are unchanged, more healthy, or less healthy post-PPS. The RAND evaluation addressed the issue of overall outcomes by studying the levels of in-hospital, 30-day post-admission, and 180-day post-admission mortality for the entire sample pre-PPS and post-PPS (Kahn et al., 1990a). For the sample of cases in the five diseases studied, in-hospital

mortality adjusted for sickness at admission fell from 16.1 percent to 12.6 percent between the two periods. Since length of stay fell 24 percent for the five diseases together, this could simply indicate that patients were discharged earlier and died outside the hospital. In fact, unweighted adjusted mortality rates 30 days after admission fell from 16.7 percent pre-PPS to 15.7 percent post-PPS, a statistically significant decline. (Weighting the data to make them nationally representative did not change the direction or significance of the effect.) Overall 180-day post-admission mortality stayed almost unchanged at just under 30 percent in both periods, with only hip fracture patients showing a significantly different and lower mortality rate. Thus Medicare patient mortality for the conditions studied has not become worse after the implementation of PPS.

With regard to other outcomes, the RAND research found some evidence of statistically significant increased readmissions within 180 days of admission for AMI patients and of lower readmissions within a year for CHF, hip fracture, and all study patients taken together. More patients admitted from home were discharged to institutions, but these usually involved short nursing home stays. The data does not indicate more prolonged nursing home stays post-PPS. Despite these generally encouraging findings for the early years of PPS the research team was concerned that problems might result if further cuts in

length of stay should occur, citing the evidence discussed above on the increase in instability at discharge and uncertainties in light of changes in the program since the period studied. However, as discussed earlier in this chapter length of stay appears to have stabilized.

Post-Hospital Care

The decreased length of hospital stay resulting from PPS is one reason why more Medicare beneficiaries are likely to need post-hospital care, such as the services delivered by SNFs, HHAs and swing-bed facilities. This section presents information concerning trends in post-hospital care utilization and the availability of post-hospital care providers. Results are presented of descriptive and econometric studies which examine post-hospital care during the period of PPS implementation. Finally, there is information describing the Department's activities regarding quality of post-hospital care and the denial and reconsideration process for HHA and SNF claims. This section provides information only on services covered by Medicare, which do not include all types of post-hospital care that beneficiaries may use.

Trends in SNF Utilization and Availability

Prior to implementation and later repeal of the Medicare Catastrophic Coverage Act (MCCA) of 1988 (effective January 1, 1989 through December 31, 1989), a patient was required to have at least a 3-day inpatient hospital stay prior to receiving Medicare coverage of SNF care. For this reason, changes in SNF utilization through 1988 are best examined relative to inpatient hospital admissions (or discharges). Table 2.13 shows that the ratio of SNF admissions to inpatient hospital admissions increased from 2.6 percent to 3.4 percent between 1983 and 1986, declined in 1987, and increased to 4.3 percent in 1988. Hence it appears that SNF utilization increased in the first years of PPS, was beginning to stabilize, but then increased sharply. The growth between 1987 and 1988 can be largely attributed to a clarification of the definition of "skilled" level of nursing care through a HCFA intermediary manual issuance, effective April 1988.

Between 1987 and 1988, the length of stay increased from 21.5 to 26 days per admission (Table 2.13). This can also be attributed to the clarification of the definition of "skilled" level of nursing care, which made it easier for more patients to qualify for longer periods of Medicare SNF coverage as well as for more patients to qualify. This is in contrast to the 25 percent decline that occurred between 1981 and 1987, when length of the

average SNF stay per admission fell from 29 days to 21.5 days. One caveat is in order--the trend in total nursing home days received by a patient after hospital discharge is unknown because the Medicare data contain information only on covered days.

With the implementation of the MCCA requirements, the Medicare SNF benefit changed in a number of ways. First, the 3-day qualifying prior hospitalization was eliminated. Second, coverage was extended from 100 days in a spell of illness to 150 days in a calendar year. Third, the number of possible coinsurance days was reduced from 80 to 8 days and moved from the end to the beginning of the period. Fourth, the SNF coinsurance was no longer linked to one-eighth of the inpatient hospital deductible ($67.50 in 1988) but to the national average per diem reasonable cost of SNF care ($25.50 in 1989).

Preliminary data indicate that these changes had a significant effect on the levels of Medicare SNF utilization. For example, there were approximately 21,000 reported Medicare SNF admissions on January 1, 1989. Less than 20 percent of this total had a prior hospital stay. A study of dually entitled beneficiaries in 12 States revealed that, of 4,562 admissions on January 1, 1989, 57 percent had been admitted to a Medicaid SNF or ICF within 60 days of their Medicare SNF admission. Later data indicate that some of these sharp increases after the effective date of the catastrophic legislation have leveled off. However,

utilization remained higher than 1988 levels. Medicare SNF benefit payments have been higher than originally anticipated due to the catastrophic legislation. HCFA actuaries have estimated that approximately 85 percent of the increase in benefit payments over the originally projected amounts are due to changes in utilization caused by a combination of the catastrophic provisions. The remaining 15 percent are most likely due to the coverage guideline changes. With the repeal of the MCCA provisions effective January 1, 1990, it is expected that SNF utilization patterns will be similar to patterns following clarification of the definition of "skilled" level of nursing care effective April 1988.

Consistent with the overall trends in utilization discussed above, the number of Medicare-certified SNFs increased from 5,197 in 1981 to 7,695 in 1988, almost a 50 percent increase. This increase has been largely due to application for certification by existing units, rather than due to construction of new ones. The increase in the number of Medicare-certified facilities suggests that Medicare beneficiaries probably have had less difficulty in recent years locating geographically accessible facilities where they could receive covered SNF care.

Trends in Medicare Home Health Utilization and Availability

Home health data from the Medicare statistical system show that the number of persons served increased slightly more than 2 percent between 1987-1988, in contrast to a slight decline between 1986-1987 and increases for the period immediately after PPS implementation (Table 2.14). The number of visits increased approximately 4 percent, greater than the increase in the number of persons served, resulting in a slight increase in the annual number of visits per person served to 24 in 1988.

To assess the effect of PPS on home health utilization, it is even more important than it was in the case of SNF care to focus on post-hospital care, since Medicare coverage of home health care is not contingent on a prior hospital stay. Gaumer and Gianfrancesco (1989) estimated that 30 percent of all home health visits occurred within 30 days of hospital discharge and, by 1986, the percentage had increased to almost 40 percent. Work is underway to update post-hospital home health care research (SNF and rehabilitation care are also being studied) using 1988 Medicare data, based on prior work by Neu and Harrison (1988).

The number of Medicare-certified HHAs has grown from 4,258 in 1983 to 5,670 in 1988. The number of home health agencies peaked in 1986 at 5,953 and has declined slightly since then.

Studies of Post-Hospital Care

The 1987 report presented analyses of the impact of PPS on use of post-hospital care in the 1981-1986 period. HCFA-sponsored research has continued analysis of data on use in this period (Gaumer, 1990). In the earlier section on analysis of episodes of care, we have discussed the overall results of this research on patients with four common conditions: pneumonia, stroke, hip replacement with fracture, and hernia. Here we focus on the substantial increase in post-hospital care use for the four conditions and the great diversity among them. There was a 40 percent increase in the rate at which hospital discharge was followed by HHA or SNF care within 7 days for stroke patients, with most receiving HHA care. Similarly, there was a 40 percent increase in post-discharge access to SNF or HHA within 7 days of discharge for hip fracture patients, although SNF use is the most common for this group. The fraction of pneumonia and hernia patients receiving post-hospital care within 7 days was low but doubled over the period, with most of the increase in HHAs. These systematic increases in post-hospital care within 7 days of discharge strongly suggest substitution of SNF and HHA care for inpatient hospital care in the period coincident with the implementation of PPS.

An additional study examined the use of post-hospital care during the last 90 days of life (Gaumer, 1990). Using the sample of

episodes ending in death discussed above, researchers studied 34,576 cases over the 1982-86 period. Although data is limited, it is possible to determine whether beneficiaries used HHA or covered SNF services within 90 days of death. Differences between urban and rural home care visit rates and SNF use rates for these terminally ill patients virtually disappeared over the study period. HHA visit rates increased during the last 90 days of life, especially in PPS States. Visit rates among this population tend to be more uniform in 1986 than in 1982. Use of SNFs changed less markedly, with a notable increase for rural areas. Overall, in 1986 18.8 percent of this population used home care and 6.2 percent used SNFs. This contrasts with 13.9 percent and 5.7 percent, respectively, for those in their last 90 days in 1982.

Post-Hospital Care in Rural Areas

There remain substantial differences between urban and rural areas in use of the Medicare HHA and SNF benefits. Use of home health care has increased substantially from 1981 to 1986, with the gap between urban and rural areas shrinking by half from an urban rate one visit per beneficiary per year higher in 1981 to a half a visit per year higher in 1986. SNF utilization was

approximately 1 covered day per beneficiary per year in urban areas from 1981 through 1985 with a decline to 0.8 days in 1986. By contrast, rural utilization was approximately 0.6 days per year in the early 1980s but began rising in 1983 to 0.7 days per year in 1986. Thus the urban-rural gap in SNF utilization was cut by three-quarters over the 1981-86 period to approximately one-tenth of a visit per beneficiary per year.

Econometric analysis of the differential effect of PPS on HHA and SNF use in urban and rural areas yields some results similar to others which contrast with the descriptive statistics on overall national trends discussed above (Gaumer, 1989). Using models similar to those discussed in last year's report (Schmitz, 1988), Gaumer reports that, relative to waiver States, urban and rural areas differ in the trends they show in HHA visits and in SNF admissions. HHA visits per beneficiary rose continuously in urban areas for 1983-85 relative to waiver States while there is no evidence of a relative HHA trend in rural areas of PPS States. Urban areas in PPS States experienced a one-time increase relative to waiver States in SNF admissions per beneficiary in 1984 while rural areas in PPS states experienced a similar one-time increase in 1985.

Home health visits within 30 days of discharge per hospital admission increased in urban areas from 1983 through 1985 while rural areas show increases in 1983 and 1984. SNF admissions

within 30 days of discharge as a share of hospital admissions increased in 1984 and 1985 in urban areas and increased in 1985 and 1986 in rural areas.

A special study of utilization of post-hospital care by hip fracture patients confirmed some of these findings using a different model at the disease-specific level (Gaumer, 1989). Looking only at patients covered by PPS, the models indicate a strong response of HHA use to PPS pressure in both urban and rural areas. Hospitals that are expected losers under PPS or more dependent on Medicare appear to more aggressively substitute home health services for inpatient care. Patients at rural hospitals that are more dependent on Medicare and who receive SNF services receive more of these services and sooner than patients at comparable hospitals with lower Medicare shares.

Course and Outcomes of Post-Hospital Care

Another study, which is being conducted by the University of Minnesota School of Public Health and the RAND Corporation with HCFA and Assistant Secretary for Planning and Evaluation (ASPE) funding, is examining the course and outcomes of post-hospital care (including rehabilitation hospital, SNF and home health

care). It involves two major components: analysis of secondary data as well as collection and analysis of primary clinical data.

In the first component, the researchers analyzed national Medicare data from the year ending June, 1985 (Neu et al., 1989). Patients were drawn from five DRGs which account for about one-eighth of Medicare hospital discharges: stroke, chronic obstructive pulmonary disease, congestive heart failure, hip/joint procedures, and hip fractures. The results indicate that patient-specific factors appear to influence post-hospital care utilization strongly. Female patients and patients with secondary diagnoses tend to use more of all kinds of post-hospital care. Older patients use more SNF care, although the oldest patients use less home health care and rehabilitative care than younger patients.

Whites are significantly more likely to use SNF care than nonwhites, whereas nonwhites are significantly more likely to use home health care than whites. Patients discharged from hospitals which treat larger numbers of poor patients--as measured by the PPS disproportionate share adjustment--are less likely to receive SNF care but more likely to use home health care than are patients discharged from other hospitals.

A number of comparisons of post-hospital care utilization rates suggest that such care may substitute for inpatient hospital

care. Patients with longer hospital stays (and presumably with more serious ailments) are more prone to use SNF and home health care. However, after controlling for the individual patient's length of stay patients from hospitals with relatively short average lengths of stay (after adjusting for case mix) are more likely to use post-hospital care than those from hospitals with longer average length of stay. Metropolitan areas with unusually short average hospital stays typically have higher SNF use rates. On the other hand, the RAND study's cross-sectional evidence is ambiguous about the relationship of hospital use and home health care utilization rates. The RAND study concludes that while SNF care seems to substitute for hospital inpatient care it is not clear whether home health care substitutes for or complements inpatient hospital care (Neu et al., 1989, p.77). The RAND authors speculate that home health care complements inpatient care because patients who remain longer in the hospital have recovered enough to require only intermittent home care rather than more intensive nursing home or rehabilitation facility care.

In addition to substitution of SNF for inpatient hospital care, different types of post-hospital care substitute for each other. For example, metropolitan areas with higher rates of SNF use than would be expected on the basis of their demographic makeup show lower than expected home health use rates.

These results have implications for policy. Since SNF and home health care appear to be substitutes for each other, policy measures that affect care in one of these settings will probably also affect care in the other. In addition, because SNF care is much cheaper than hospital care, the apparent substitution of SNF for hospital care may suggest a way to achieve Medicare cost savings. Finally, they note that if hospital care and home health care are complements it may be necessary to incur greater Medicare hospital costs before patients are well enough to use home care. This would offset, at least in part, the hospital cost savings gained from attempting to substitute home health for hospital care.

The second component of this study, which is being performed by the University of Minnesota School of Public Health, takes the same DRGs used in the national data analysis and conducts a detailed examination of clinical cases at three sites (Pittsburgh, Houston, and the Twin Cities). Three forms of post-hospital care are being studied: nursing home, home health, and rehabilitative care (whether in a rehabilitation hospital or a unit of an acute care hospital). Information is gathered from selected Medicare beneficiaries at four points in time: acute care hospital discharge, and at 6 weeks, 6 months, and 1 year following hospitalization. Information is being collected on factors such as demographic characteristics, functional status, and severity of illness. In addition to information obtained

from patients and their caregivers, patients' hospital records were abstracted using a modification of the Medical Illness Severity Grouping System approach.

Primary data collection is now drawing to a close. Approximately 2700 discharges from 52 hospitals at the three sites have been interviewed and followed longitudinally, together with their informal caregivers. Analyses of data are now underway. Preliminary results comparing the patterns of post-hospital care for the five DRGs under study indicate that different factors play an important role depending upon DRG and site studied. For example, living alone was associated with greater likelihood of getting home health and nursing home care for congestive heart failure and with greater likelihood of getting each of the three forms of care studied for hip procedures and strokes. Greater age was associated with more nursing home care for strokes and hip fractures and with more of each of the types of post-hospital care studied for hip procedures. Compared to the Twin Cities, Pittsburgh patients were more likely to receive rehabilitation for stroke, home health for hip fractures, and all three types of care for hip procedures.

Procedures for Assuring Quality of Post-Hospital Care

Section 9305(i) of OBRA 86 requires that each annual report include an evaluation of the adequacy of the procedures for

assuring quality of post-hospital services furnished under title XVIII of the Social Security Act. HCFA assures quality of post-hospital care in a number of ways. First, it sets requirements of participation in the Medicare program focusing on quality and operates a survey and certification process for long-term care facilities and agencies to assure that these requirements are met. Second, it establishes provisions specifying activities with respect to aftercare. Finally, HCFA is establishing conditions of participation for hospitals requiring discharge planning.

In the first area, HCFA will be implementing new requirements for nursing home facilities that are designed to improve the quality of care and quality of life in these institutions. These conditions include annual resident assessments, 24-hour nursing coverage, nurses' aide training, and pre-admission screening and resident review for mentally retarded, developmentally disabled, and mentally ill individuals. In addition, significant changes in the survey process were implemented in August 1986 that focus survey efforts on the quality of care furnished to long-term care residents. Additional survey revisions were implemented in October 1990. As of that date, the distinction between SNFs and ICFs under Medicaid will no longer exist; all facilities will be considered nursing facilities.

Quality assurance procedures and efforts are also being strengthened and expanded in the home health survey process. This process is also being revised as an outcome-oriented approach and were implemented in 1990. Standardized assessment tools and survey protocols have been developed to evaluate patient outcomes.

In the second area, PROs are required to review at least a sample of cases readmitted to PPS hospitals within 31 days and the intervening post-hospital care period, including SNF, HHA, and some outpatient services. Generic quality screens have been used since April 1989 by the PROs to assess the quality of post-hospital care.

In the third area, hospitals would be required to have a discharge planning process as a distinct condition of participation for the Medicare and Medicaid programs. The elements of that discharge planning process will also be specified to improve the likelihood that a patient's post-hospital placement will be appropriate. A proposed rule that would implement this requirement was issued in June 1988 and awaits final action.

In addition, an Advisory Panel established by OBRA 86--in conjunction with HCFA researchers--developed a uniform needs assessment instrument that could potentially be used by hospitals

and other providers for evaluating an individual's need for post-hospital extended-care services, home health services, and long-term care services. This instrument collects information on sociodemographics, health status, functional status, environmental factors in post-discharge care, nursing and other care requirements, family and community support, patient/family goals and preferences and options for continuing care.

Evaluating the Appropriateness of Post-Hospital Care

Section 9305(i) of OBRA 86 requires that each annual report provide information concerning the assessment of problems that have prevented beneficiaries from receiving appropriate post-hospital care. HCFA and ASPE have undertaken a major study to provide more definitive information on the appropriateness and effectiveness of post-hospital care. Appropriateness and effectiveness will be assessed through the use of professionally developed guidelines for care and through health status outcome assessments. The other objective of the study is to determine the nature and extent of problems encountered by patients in obtaining post-hospital care and to assess other factors associated with less than adequate service patterns, including potential barriers to the receipt of needed services (e.g., financial barriers and provider availability), informal caregiver

burdens, out-of pocket costs, discharge planning, and patient satisfaction.

A pilot study was undertaken to field test methods for determining the appropriateness of post-discharge aftercare services. All types of post-hospital care are being studied, including both skilled and unskilled care. Study methods involve classifying patients at the time of hospital discharge according to their post-discharge service needs and applying professionally developed guidelines to project aftercare needs. Projected need and patient outcomes will then be compared with services received based on interview data.

Reconsiderations and Appeals for Payment of Post-Hospital Service

Section 9305(i) of OBRA 86 requires that information on Medicare reconsiderations and appeals with respect to payment for post-hospital services be included in each annual PPS report. Medicare beneficiaries have a right to have decisions regarding payment of their denied Medicare Part A claims reconsidered by intermediaries. If dissatisfied with the reconsideration decision, beneficiaries have the option of filing for an informal hearing conducted by an Administrative Law Judge (ALJ). The procedures governing this appeal process were described in last year's report.

There has been Congressional concern about SNF and HHA denials. OBRA 87 expanded these rules to require that when a fiscal intermediary denies a provider's claim for home health, extended care, or post-hospital extended care services, it must furnish the provider and the beneficiary with a written explanation of the denial and its statutory or regulatory bases, and promptly notify these parties of the disposition of a reconsideration.

OBRA 87 also provided that beginning October 1, 1988, fiscal intermediaries must meet certain performance standards for providers other than a hospital. Contracts and pertinent regulations must be modified as necessary to complement these requirements.

In fiscal year 1989 approximately 10.5 percent of SNF claims were denied, compared to 22 percent in fiscal year 1988. In fiscal year 1989 there were 10,496 reconsideration requests which comprised 6.2 percent of denied SNF claims and 0.7 percent of all SNF claims. Including submissions from the previous year 10,385 requests were processed, of which 3,601 were reversed in whole or in part. There were 1,439 ALJ cases completed, of which 795 were reversed. During fiscal year 1989, approximately 3.0 percent of HHA claims were denied, compared to 3.6 percent in fiscal year 1988. In fiscal year 1989, there were 28,475 home health care cases submitted for reconsideration, which comprised

approximately 17.6 percent of all HHA denials and 0.5 percent of all HHA claims. Including submissions from the previous year, a total of 28,804 cases were processed, of which 11,759 were reversed. In fiscal year 1989, 7,499 hearings were heard with 5,074 reversed partially or fully.

Table 2.1

Discharges per 1,000, average length of stay, days of care per 1,000 beneficiaries and percent change for aged Medicare beneficiaries, U.S. Total by Age, Sex, and Race: 1980 through 1987

Age, sex and race	Calendar year 1980	1981	1982	1983	1984	1985	1986	1987	1980-83	1983-87	1983-87
				Discharges per 1,000					Average Annual percent change		Total Change
Total	371	380	388	394	387	354	328	313	2.1%	-5.7%	-20.8%
Age											
65-69	287	294	292	295	284	255	234	223	1.0%	-6.8%	-24.5%
70-74	344	351	359	365	357	326	301	286	2.0%	-5.9%	-21.6%
75-79	414	424	435	443	435	397	366	349	2.3%	-5.8%	-21.2%
80-84	474	490	504	513	505	467	433	413	2.7%	-5.3%	-19.4%
85+	518	527	546	556	554	519	488	466	2.4%	-4.3%	-16.2%
Sex											
Male	402	410	414	421	411	382	357	339	1.6%	-5.3%	-19.5%
Female	350	359	370	376	370	335	309	295	2.5%	-5.9%	-21.7%
Race											
White	376	386	393	399	391	357	332	314	2.0%	-5.8%	-21.3%
Other	326	335	351	358	352	332	300	301	3.1%	-4.2%	-15.9%
				Average Length of Stay							
Total	10.3	10.1	9.9	9.6	8.7	8.4	8.4	8.6	-2.3%	-2.6%	-10.0%
Age											
65-69	9.4	9.2	9.1	8.8	8.1	7.7	7.7	7.7	-2.2%	-3.2%	-12.1%
70-74	9.9	9.7	9.6	9.3	8.5	8.2	8.2	8.4	-2.2%	-2.5%	-9.6%
75-79	10.5	10.2	10.1	9.7	8.9	8.6	8.6	8.8	-2.4%	-2.4%	-9.2%
80-84	11.0	10.8	10.6	10.2	9.2	8.8	8.9	9.2	-2.6%	-2.5%	-9.7%
85+	11.4	11.2	11.0	10.6	9.6	9.0	9.1	9.4	-2.5%	-2.8%	-10.9%
Sex											
Male	9.9	9.7	9.6	9.3	8.6	8.2	8.2	8.3	-2.0%	-2.9%	-10.9%
Female	10.5	10.3	10.1	9.8	8.9	8.6	8.6	8.9	-2.5%	-2.4%	-9.2%
Race											
White	10.1	9.9	9.8	9.5	8.6	8.3	8.3	8.5	-2.3%	-2.7%	-10.2%
Other	11.3	11.1	11.0	10.6	9.6	9.2	9.3	9.6	-2.1%	-2.5%	-9.4%
				Total Days of Care per 1,000							
Total	3,804	3,820	3,847	3,779	3,378	2,971	2,764	2,696	-0.2%	-8.1%	-28.7%
Age											
65-69	2,692	2,699	2,652	2,594	2,289	1,968	1,799	1,721	-1.2%	-9.8%	-33.7%
70-74	3,407	3,412	3,433	3,378	3,016	2,669	2,479	2,394	-0.3%	-8.3%	-29.1%
75-79	4,329	4,336	4,384	4,316	3,857	3,394	3,156	3,090	-0.1%	-8.0%	-28.4%
80-84	5,207	5,282	5,327	5,214	4,653	4,129	3,854	3,794	0.0%	-7.6%	-27.2%
85+	5,926	5,905	6,012	5,892	5,325	4,691	4,436	4,401	-0.2%	-7.0%	-25.3%
Sex											
Male	3,982	3,996	3,981	3,930	3,520	3,126	2,921	2,818	-0.4%	-8.0%	-28.3%
Female	3,683	3,701	3,757	3,678	3,283	2,866	2,663	2,614	0.0%	-8.2%	-28.9%
Race											
White	3,818	3,831	3,846	3,777	3,378	2,958	2,760	2,669	-0.4%	-8.3%	-29.3%
Other	3,695	3,734	3,856	3,797	3,381	3,068	2,796	2,893	0.9%	-6.6%	-23.8%

Note: Calculations of percentage change may not agree with entries in the table due to rounding.

Source: MedPAR/Patbill Files and Medicare Enrollment Counts, 1980 through 1987.

Table 2.2

Discharges per 1,000 aged Medicare beneficiaries and percent change for the 20 most common DRGs in 1984: 1984 to 1987

Diagnosis Related Group	Title	Discharges per 1,000 1984	1985	1986	1987	Annual Percent 84-87	Total change 84-87
127	Heart Failure and Shock	18.7	18.5	17.3	16.8	-3.4%	-9.8%
182-184	Eso/Gastro/Misc Dig	16.9	13.1	11.3	10.2	-15.5%	-39.7%
039	Lens Procedures	16.8	6.0	1.9	1.0	-60.6%	-93.9%
089-091	Pneumonia	12.3	13.3	13.1	11.9	-1.0%	-3.1%
121-123	AMI	12.1	12.0	11.3	10.8	-3.6%	-10.3%
014	Spec Cerebro. Dis	11.8	11.8	11.3	11.0	-2.4%	-7.0%
140	Angina	10.7	11.7	11.7	11.5	2.3%	7.1%
138-139	Card Arrhythmia	9.0	8.6	8.2	8.1	-3.4%	-10.0%
088	Chr Obstr Pul Dis	7.7	5.9	5.2	3.5	-23.2%	-54.7%
096-098	Bronchitis	7.2	7.1	7.1	7.2	0.1%	0.2%
243	Back Problems	7.1	5.9	4.9	4.2	-15.9%	-40.5%
336-337	Prostatectomy	17.2	17.3	17.1	18.2	1.8%	5.6%
015	Tr Ischemic Att	6.7	6.5	5.8	5.2	-7.9%	-22.0%
296-298	Nutri/Mis Metabol Dis	6.3	7.7	7.7	7.4	5.8%	18.6%
174-175	G.I.Hemorr	5.7	5.9	5.7	5.4	-1.6%	-4.8%
468	Unrelated OR Proc	5.6	5.0	4.7	4.1	-9.8%	-26.7%
209	Maj Joint Procs	5.6	6.0	6.2	6.4	5.0%	15.8%
320-322	Kid Infect	5.5	5.2	5.6	5.7	1.2%	3.6%
132-133	Atherosclerosis	5.2	2.1	1.3	0.9	-44.7%	-83.1%
294-295	Diabetes	5.1	3.9	3.5	3.0	-15.8%	-40.3%
	Sub-Total	183.0	163.1	150.8	141.9	-8.1%	-22.4%

Note: Calculations of percentage change may not agree with entries in the table due to rounding.

Source: MedPAR/Patbill Files and Medicare Enrollment Counts, 1980 to 1987.
* = Rates for prostatectomy are based on male enrollment only.

Table 2.3

Average Length of Stay for aged Medicare beneficiaries and percent change for the 20 DRGs with the longest stays in 1984: 1984 to 1987

Diagnosis Related Group	Title	Discharges per 1,000 1984	1985	1986	1987	Annual Percent 84-87	Total change 84-87
148-149	Maj Bowel Procs	17.3	16.1	15.9	16.0	-2.7%	-7.9%
210-212	Hip/Fem Procs	16.8	15.0	14.4	14.1	-5.7%	-16.2%
468	Unrelated OR Proc	16.6	14.9	14.8	16.0	-1.2%	-3.6%
209	Maj Joint Procs	16.0	14.3	13.6	13.0	-6.6%	-18.6%
110-111	Maj Recon Vasc Procs	15.7	14.8	14.7	14.8	-1.9%	-5.5%
430	Psychoses	15.3	15.9	16.1	16.9	3.5%	10.8%
154-156	Sto/Eso/Duo Procs	14.4	15.9	15.7	15.7	2.9%	9.1%
195-198	Cholecystectomy	12.6	11.6	11.2	11.0	-4.5%	-12.9%
236	Fract Hip/Pelvis	12.2	11.1	10.0	9.8	-7.2%	-20.1%
112	Vasc Procs Exc Maj Re	12.2	11.7	10.1	8.2	-12.3%	-32.6%
014	Spec Cerebro. Dis	12.1	10.9	10.6	10.6	-4.4%	-12.6%
416-417	Septicemia	11.4	10.6	10.5	10.6	-2.3%	-6.6%
012	Degen Nervous Sys Dis	11.0	12.6	12.1	12.5	4.2%	13.1%
316	Renal Failu	10.5	9.7	9.5	9.8	-2.4%	-7.0%
403-405	Lymph - Leukemia	10.2	10.6	10.9	10.6	1.4%	4.3%
429	Org Dis & M.R.	10.2	10.4	10.8	11.7	4.9%	15.5%
087	Pul Edema/ Resp Fail	10.1	9.5	9.3	8.9	-4.2%	-12.0%
121-123	AMI	10.1	9.3	8.9	8.6	-5.0%	-14.2%
203	Malig - Hep, Pan	9.9	9.4	9.1	9.4	-1.7%	-4.9%
172		9.9	9.6	9.3	9.4	-1.7%	-5.1%
	Sub-Total	12.7	12.2	11.9	11.9	-2.3%	-6.7%

Note: Calculations of percentage change may not agree with entries in the table due to rounding.

Source: MedPAR/Patbill Files, 1980 to 1987.

Table 2.4

Discharges per 1,000 beneficiaries, average length of stay, days of care per 1,000 beneficiaries and percent change for disabled beneficiaries, U.S. Total by Age, Sex, and Race, 1980 through 1987

Age, sex and race	Calendar year 1980	1981	1982	1983	1984	1985	1986	1987	1980-83	1983-87	1983-87
				Discharges per 1,000					Average Annual Percent Change		Total Change
Total	390	397	405	408	382	366	353	327	1.5%	-5.3%	-19.7%
Age											
0-44 years	288	292	304	305	262	272	266	267	1.9%	-3.2%	-12.3%
45-54 years	390	404	409	419	390	369	351	334	2.4%	-5.5%	-20.1%
55-64 years	434	444	453	454	444	419	411	396	1.6%	-3.4%	-12.9%
Sex											
Male	362	371	378	381	354	344	333	322	1.7%	-4.1%	-15.4%
Female	437	441	453	454	430	403	388	372	1.3%	-4.8%	-17.9%
Race											
White	402	409	417	418	392	374	360	345	1.3%	-4.7%	-17.6%
Other	333	343	357	362	340	331	324	325	2.8%	-2.7%	-10.3%
				Average length of stay							
Total	9.6	9.5	9.5	9.3	8.5	8.3	8.3	8.4	-1.0%	-2.5%	-9.7%
Age											
0-44 years	9.1	9.5	9.5	9.5	8.7	8.7	8.9	9.1	1.5%	-1.1%	-4.2%
45-54 years	9.2	9.1	9.2	9.0	8.3	8.0	8.1	8.0	-0.6%	-2.9%	-11.0%
55-64 years	9.8	9.7	9.5	9.3	8.6	8.2	8.2	8.2	-1.7%	-3.2%	-12.3%
Sex											
Male	9.3	9.2	9.2	9.0	8.3	8.1	8.2	8.2	-1.0%	-2.3%	-8.9%
Female	10.0	9.9	9.9	9.7	8.8	8.5	8.6	8.6	-1.1%	-2.8%	-10.7%
Race											
White	9.4	9.3	9.3	9.1	8.4	8.1	8.2	8.2	-1.0%	-2.6%	-10.0%
Other	10.6	10.4	10.5	10.2	9.3	8.9	9.0	9.1	-1.3%	-2.8%	-10.6%
				Days of care per 1,000							
Total	3,734	3,770	3,834	3,784	3,253	3,021	2,946	2,742	0.4%	-7.7%	-27.6%
Age											
0-44 years	2,621	2,762	2,901	2,897	2,276	2,363	2,359	2,433	3.4%	-4.3%	-16.0%
45-54 years	3,582	3,662	3,755	3,772	3,218	2,942	2,828	2,682	1.7%	-8.2%	-28.9%
55-64 years	4,250	4,298	4,320	4,228	3,798	3,431	3,384	3,232	-0.2%	-6.5%	-23.6%
Sex											
Male	3,361	3,428	3,467	3,433	2,943	2,781	2,719	2,645	0.7%	-6.3%	-22.9%
Female	4,373	4,356	4,464	4,386	3,792	3,440	3,343	3,215	0.1%	-7.5%	-26.7%
Race											
White	3,780	3,813	3,857	3,808	3,279	3,039	2,957	2,827	0.2%	-7.2%	-25.8%
Other	3,526	3,578	3,737	3,681	3,144	2,950	2,906	2,954	1.4%	-5.3%	-19.7%

Note: Calculations of percentage change may not agree with entries in the table due to rounding.

Source: MedPAR/Patbill Files and Medicare Enrollment Counts, 1980 to 1987.

Table 2.5

Discharges per 1,000 beneficiaries, average length of stay, days of care per 1,000 beneficiaries and percent change for end stage renal disease Medicare beneficiaries on dialysis, U.S. Total by Age: 1981 through 1987

	Calendar year							Average Annual Percent Change		Total Change
Age	1981	1982	1983	1984	1985	1986	1987	81-83	83-87	83-87
			Discharges per 1,000							
Total	1,221	1,166	1,206	1,240	1,221	1,288	1,303	-0.4%	2.0%	8.1%
0-14	1,392	1,533	1,523	1,081	879	950	907	3.0%	-12.2%	-40.5%
15-24	1,075	1,096	1,069	1,010	939	1,020	1,067	-0.2%	-0.1%	-0.2%
25-34	1,062	1,109	1,085	1,062	1,033	1,127	1,160	0.7%	1.7%	6.9%
35-44	1,105	1,117	1,117	1,118	1,067	1,112	1,130	0.3%	0.3%	1.2%
45-54	1,158	1,137	1,197	1,143	1,150	1,171	1,174	1.1%	-0.5%	-1.9%
55-64	1,276	1,262	1,264	1,285	1,230	1,261	1,289	-0.3%	0.5%	2.0%
65+	1,376	1,139	1,256	1,410	1,399	1,513	1,494	-3.0%	4.4%	19.0%
			Average Length of stay							
Total	10.3	10.1	10.0	8.8	8.6	9.0	9.4	-0.9%	-1.5%	-5.7%
0-14	9.6	9.5	9.4	8.5	8.7	9.2	9.5	-0.5%	0.1%	0.5%
15-24	9.2	8.7	8.4	7.3	7.2	7.3	8.0	-2.9%	-1.2%	-4.6%
25-34	9.6	9.0	8.8	7.8	7.6	7.7	8.1	-3.0%	-2.0%	-7.6%
35-44	9.9	9.6	9.2	8.1	7.9	8.2	8.5	-2.3%	-2.2%	-8.3%
45-54	9.8	9.7	9.5	8.3	8.2	8.6	8.9	-0.8%	-1.7%	-6.5%
55-64	10.3	10.4	10.1	8.9	8.5	8.9	9.4	-0.5%	-2.0%	-7.6%
65+	11.2	10.8	11.1	9.7	9.4	9.9	10.2	-0.5%	-2.0%	-7.6%
			Days of care per 1,000							
Total	12,559	11,723	12,050	10,969	10,553	11,616	12,281	-1.4%	0.5%	1.9%
0-14	13,294	14,570	14,345	9,170	7,687	8,699	8,585	2.6%	-12.0%	-40.2%
15-24	9,864	9,484	8,998	7,365	6,754	7,460	8,559	-3.0%	-1.2%	-4.9%
25-34	10,214	9,963	9,541	8,287	7,883	8,650	9,425	-2.2%	-0.3%	-1.2%
35-44	10,929	10,737	10,307	9,113	8,447	9,162	9,564	-1.9%	-1.9%	-7.2%
45-54	11,291	11,056	11,408	9,476	9,416	10,048	10,461	0.3%	-2.1%	-8.3%
55-64	13,139	13,134	12,825	11,449	10,506	11,240	12,081	-0.8%	-1.5%	-5.8%
65+	15,456	12,343	13,895	13,721	13,204	14,903	15,277	-3.5%	2.4%	9.9%

Note: Calculations of percentage change may not agree with entries in the table due to rounding.

Source: HCFA, BDMS, OSDM, ESRD Program Management and Medical Information System data: 1981 to 1987.

Table 2.6

Episodes Involving Hospitalization:

Stroke Episodes

	1981	1986	% Change
Number of Cases	4,068	3,827	
During Stay			
Average LOS	12.7	9.6	(24.4)*
% Using ICCU	18.1	24.9	37.6
% Readmit in 7 days	3.0	6.1	103.3 *
Physician and Part B Use (30 days pre-30 days post)			
% Using DME	18.2	22.5	23.6 *
MD Office Reim.**	$ 30	$ 45	50.0 *
MD Inpatient Reim.**	$ 439	$ 391	(10.9)
Number of OPD Visits	.09	.04	(55.6)
Post Hospital Care (in 7 days post discharge)			
% Using SNF or HHA	20.0	28.2	41.0 *

Hip Replacement: Fractures

	1981	1986	% Change
Number of Cases	640	1,829	
During Stay			
Average LOS	18.1	13.3	(26.5)*
% Using ICCU	16.2	18.0	11.1
% Readmit in 7 days	2.2	4.6	109.1 *
Physician and Part B Use (30 days pre-30 days post)			
% Using DME	27.3	35.0	28.2 *
MD Office Reim.**	$ 46	$ 62	34.8 *
MD Inpatient Reim.**	$1,392	$1,139	(18.2)*
Number of OPD Visits	.103	.032	(68.9)
Post Hospital Care (in 7 days post discharge)			
% Using SNF or HHA	38.7	53.0	37.0 *

* Test of difference in means for 1981-1983 and 1984-1986, p<=.05

** Reimbursement deflated using DRI's Medical Care Price Index

Table 2.6
(cont.)
Simple Pneumonia

	1981	1986	% Change
Number of Cases	4,809	4,352	
During Stay			
Average LOS	9.9	8.3	(16.2)*
% Using ICCU	10.4	12.7	2.3
% Readmit in 7 days	3.9	4.2	22.1
Physician and Part B Use			
(30 days pre-30 days post)			
% Using DME	13.2	20.6	56.1 *
MD Office Reim.**	$ 29	$ 43	48.3 *
MD Inpatient Reim.**	$ 329	$ 254	(22.8)*
Number of OPD Visits	.103	.062	(39.8)
Post Hospital Care			
(in 7 days post discharge)			
% Using SNF or HHA	6.7	14.2	111.9 *

Inguinal Hernia Repair

	1981	1986	% Change
Number of Cases	1,715	1,810	
During Stay			
Average LOS	5.8	3.5	(39.7)*
% Using ICCU	2.6	2.2	(15.4)
% Readmit in 7 days	.9	1.6	77.8 *
Physician and Part B Use			
(30 days pre-30 days post)			
% Using DME	2.4	4.3	79.2
MD Office Reim.**	$ 33	$ 45	36.4
MD Inpatient Reim.**	$ 565	$ 383	(32.2)*
Number of OPD Visits	.086	.072	(16.3)
Post Hospital Care			
(in 7 days post discharge)			
% Using SNF or HHA	1.1	2.6	136.4*

Test of difference in means for 1981-1983 and 1984-1986, p<=.05
** Reimbursement deflated using DRI's Medical Care Price Index
Source: Gary L. Gaumer, "Medicare Episodes Involving Hospitalization and Death," Working Paper, Abt Associates, Inc. January 23, 1990, HCFA Contract 500-88-0035.

Table 2.7

Urban/Rural Beneficiary Comparisons:
General Episode Outcomes

	Urban	Rural
1. Total Hospital Days (30 Day Pre/Post)[1]		
1981	10.92	9.61
1986	9.54	8.45
% Change	-12.6	-12.1
2. Rehospitalization Rate (Post 60)[3]		
1981	0.22	0.24
1986	0.23	0.25
% Change	4.5	4.2
3. Total Episode Reimbursements (30 Day Pre/Post)[1]		
1981	$4,142	$2,794
1986	$6,620	$4,791
% Change	59.0	71.5
4. Average Part B Reimbursement (30 Day Pre/Post)[1]		
1981	$ 877	$ 545
1986	$1,166	$ 832
% Change	33.0	52.6
5. Average Reimbursement (Post 30)[2]		
1981	$ 625	$ 506
1986	$1,157	$1,016
% Change	85.1	100.8
6. HHA Reimbursement (Post 30)[2]		
1981	$ 30	$ 15
1986	$ 77	$ 52
% Change	156.7	246.7
7. SNF Reimbursement (Post 30)[2]		
1981	$ 36	$ 7
1986	$ 50	$ 35
% Change	38.8	400.0

Table 2.7
(continued)

Notes:
[1]-30 Day Pre/Post: Period beginning 30 days pre-admission, including stay, and ending 30 days post-discharge.

[2]-Post 30: Period beginning at discharge and ending 30 days post-discharge.

[3]-Post 60: Period beginning at discharge and ending 60 days post-discharge.

Source: Gary L. Gaumer, "Medicare Use in Rural Areas," Working Paper, Abt Associates, Inc. October 12, 1989, HCFA Contract 500-88-0035.

Table 2.8

Medicare Hospital Utilization

	Admissions Per Enrollee	LOS	Days Per Enrollee
<u>Urban Beneficiaries</u>			
1981	.33	10.8	3.65
1986	.30	8.9	2.64
% Change	-9.1%	-17.6%	-27.7%
<u>Rural Beneficiaries</u>			
1981	.41	8.8	3.75
1986	.34	7.1	2.52
% Change	-17.1%	-19.3%	-32.8%

<u>Source</u>: Gary L. Gaumer, "Medicare Use in Rural Areas," Working Paper, Abt Associates, Inc. October 12, 1989, HCFA Contract 500-88-0035.

Table 2.9

1987 Medicare Discharges: Rural Beneficiaries

	Urban Hospitals	Rural Hospitals
% Total Discharges (of rural beneficiaries)	28.7%	71.3%
% Surgical Discharges	74.0%	45.8%
Average LOS	9.0 days	7.2 days
Average Charges/Discharge	$ 7,701	$ 4,270

Notes: Surgical discharges are defined as any discharge which includes any operative procedure recorded on the patient's billing form defined as surgery in the International Classification of Diseases, 9th Revision, Clinical Modification, Public Health Service-Health Care Financing Administration, 1980.

Source: Bureau of Data Management and Strategy, Health Care Financing Administration. Data development by the Office of Research, HCFA.

Table 2.10

Admission Rates for Medicare Beneficiaries:
1984-1986

Local Hospital-Focused Case Types

	Rural Beneficiaries			Urban Beneficiaries		
Case Type	1984	1986	% Change	1984	1986	% Change
Medical-Local	226.36	170.85	-25	163.57	133.74	-18
Surgical-Local	31.03	30.01	-3	29.68	27.94	-6
Low Variation	48.18	43.43	-10	42.40	36.96	-13
In/Out Option	24.04	6.07	-75	23.40	5.92	-75
TOTAL LOCAL	329.52	250.11	-24	259.06	204.45	-21

Referral Hospital-Focused Case Types

	Rural Beneficiaries			Urban Beneficiaries		
Case Type	1984	1986	% Change	1984	1986	% Change
Medical-Mixed	62.42	47.23	-24	53.03	42.13	-21
Surgical-Mixed	16.85	16.19	-4	17.45	17.45	0
Tech-Intensive	22.56	23.70	5	24.02	25.02	4
TOTAL SPECIALTY	101.83	87.12	-14	94.50	84.60	-10

Definitions:

Medical(surgical)-local: local, often small hospitals account for majority of admissions.
Medical(surgical)-mixed: a third or more of the admissions are to rural referral centers or large urban hospitals.
Technology-intensive: large rural and urban hospitals dominate for these procedures and treatments.
In/out-patient: procedures where treatment in the outpatient setting is common.
Low variation: medical and surgical procedures for which strong consensus exists on the need for hospitalization for treatment of a condition or to perform a certain procedure.

Source: Codman Research Group, Inc., "The Relationship Between Declining Use of Rural Hospitals and Access to Inpatient Services for Medicare Beneficiaries in Rural Areas", January 1990.

Table 2.11

Hospital Use and Mortality Rates
in the Last 90 Days of Life

	1982	1983	1984	1985	1986
Admission rates for death episodes	67.5	68.2	66.3	65.4	66.0
Days of hospital care for death episodes	13.2	12.9	11.8	10.8	10.9
Medicare provider at time of death:					
Death in hospital	51.1	50.7	46.7	44.6	45.4
Rural beneficiary	54.0	51.8	45.7	44.6	45.5
Urban beneficiary	49.8	50.0	47.3	44.6	45.3
Death preceded by SNF services	1.9	1.7	2.2	2.2	2.0
Death preceded by home care services	6.2	6.8	8.3	9.3	9.7
Death preceded by other Part B services	31.5	31.3	33.7	35.9	34.7
No Medicare services in 90 days before death	9.3	9.6	9.1	8.0	8.2
Percent of death episodes involving hospitalization:					
Dead at discharge	75.7	74.3	70.5	68.2	68.8
Dead 1-15 days after discharge	10.9	10.9	13.4	14.6	13.8
Dead 1-30 days after discharge	16.3	16.7	19.9	21.0	20.7
Dead 1-15 days after admission	51.2	52.6	53.1	53.9	53.8

Source: Gary L. Gaumer, "Medicare Episodes Involving Hospitalization and Death," Working Paper, Abt Associates, Inc. January 23, 1990, HCFA Contract 500-88-0035.

Table 2.12

30 Day Post Admission Mortality Rates for Medicare
Fiscal Year 1987, by Selected Disease Categories

Code	Disease Category	Total Discharges	Actual Percent Dead	Expected Percent Dead	Standard. Mortality Ratio
215	Head Injury, including intracranial	33,445	10.1%	10.2%	0.99
242	Alcoholism	79,782	4.3%	4.6%	0.94
251	Cerebrovascular Disease	369,282	12.7%	12.9%	0.98
290	Other Nervous System Conditions	68,576	5.0%	3.6%	1.36
504	Bacterial Pneumonia	415,085	16.5%	17.5%	0.94
525	Bronchititis/Obstructive Pulmonary Disease	289,149	7.4%	6.8%	1.09
527	Cancer - Lung	125,934	26.5%	25.6%	1.04
590	Other Respiratory Conditions	260,191	10.0%	9.9%	1.01
620	Vascular Insufficiency of INtestine	16,477	28.9%	33.3%	0.87
624	Cancer - Colon and Rectum	107,162	10.9%	13.4%	0.81
690	Other Gastrointestinal Conditions	245,288	8.8%	8.9%	0.99
704	Cirrhosis of the Liver	22,903	20.5%	20.6%	1.00
710	Cancer - Pancreas	20,799	31.4%	32.7%	0.96
808	Tibia, Iliac, Femoral or Pop. Artery Dx	83,673	6.9%	7.2%	0.96
813	Aneurysm, Abdominal	36,357	17.7%	18.3%	0.97
815	Coronary Artery Disease (Acute MI)	1,112,273	9.2%	11.0%	0.84
821	Arrhythmias/Condition Disorders	470,185	6.8%	7.0%	0.97
822	Disease of Aortic Valve	44,233	8.3%	9.0%	0.92
829	Essential Hypertension	295,126	6.7%	7.1%	0.94
890	Other Cardiovascular Conditions	338,079	11.0%	11.9%	0.92
901	Urinary Tract INfections	196,802	9.7%	8.2%	1.18
902	Acute Renal Failure	53,297	21.3%	22.6%	0.94
903	Cancer - Genitourinary	55,634	4.9%	5.5%	0.89
1001	Carcinoma - Prostate	102,175	6.9%	8.1%	0.85
1214	Diabetes Mellitus	235,156	5.8%	5.9%	0.99
1290	Other Endocrin/Metabolic Conditions	218,192	12.8%	11.5%	1.12
1305	Acute Granulocytic Leukemia	6,979	33.7%	30.4%	1.11
1690	Other Bacterial Diseases	28,747	28.4%	29.8%	0.95
1691	Other Neoplasms	47,618	13.5%	13.1%	1.03
1693	Other General Conditions	260,480	3.0%	4.5%	0.66
1698	Carcinoma - Unstated Primary	59,759	29.9%	26.8%	1.12
Grp 1	5 Diseases: Stage/Comorb.	560,643	7.7%	7.9%	0.97
Grp 2	14 Diseases: Stage	916,210	5.1%	4.6%	1.11
Grp 3	31 Diseases	1,492,818	3.3%	2.8%	1.17
Grp 4	16 Body Systems	1,426,372	2.6%	2.0%	1.29
	All Discharges	10,094,881	7.6%	7.7%	0.99

* = significant at .05 level
* = significant at .01 level

Note: Stand. Mortality Ratio is the standardized mortality ratio, the ratio of actual mortality to expected mortality.

Source: Fiscal Year 1984 and Fiscal Year 1987 MedPAR files: Bureau of Data Management and Strategy, Analysis by SysteMetrics/McGraw Hill.

Table 2.13 Trends in Medicare SNF Utilization: 1980 - 1988

Year	SNF Admissions	Admissions per 1000 Enrollees	SNF/ Hospital Admissions Ratio	Covered Patient Days: Number (millions)	Percent Change	Per 1000 Enrollees	Percent Change	Per Hospital Admission	Percent Change	Average Days per Admission	Percent Change
1980	278,849	9.3	0.0267	8.7	n.a.	308.6	n.a.	0.83	n.a.	29.6	n.a.
1981	273,325	9.6	0.0252	8.6	-1.1%	300.0	-2.8%	0.79	-4.8%	29.2	-1.4%
1982	n.a.	n.a.	n.a.	8.7	1.2%	299.3	-0.2%	0.77	-2.5%	n.a.	n.a.
1983	308,929	10.4	0.0264	9.1	4.6%	307.3	2.7%	0.78	1.3%	29.2	n.a.
1984	332,746	11.1	0.0290	8.9	-2.2%	295.2	-3.9%	0.78	0.0%	26.6	-8.9%
1985	352,652	11.5	0.0330	8.3	-6.7%	270.0	-8.5%	0.77	-1.3%	23.4	-12.0%
1986	347,418	11.1	0.0340	7.7	-7.2%	273.0	1.1%	0.74	-3.9%	22.4	-4.3%
1987	327,012	10.3	0.0321	7.0	-9.1%	221.0	-19.0%	0.69	-6.8%	21.5	-4.0%
1988	439,060	13.5	0.0428	11.4	62.9%	352.0	59.3%	1.11	60.9%	26.0	20.9%

Notes: Data through 1987 based on claims processed through December 31, 1988 and include PPS waiver States. 1988 data are preliminary.

Source: HCFA, Office of Research and Demonstrations.

Table 2.14

Trends in Utilization of Medicare Home Health Agency Services: Persons Served and Home Health Visits

	Persons Served				Home Health Visits					
Year	Number (000)	Percent Change	Per 1000 Enrollees	Percent Change	Number (000)	Percent Change	Per Person Served	Percent Change	Per 1000 Enrollees	Percent Change
1980	957.4	--	34	--	22,428	--	23	--	788	--
1982	1,171.9	22.4%	40	17.6%	30,787	37.3%	26	13.0%	1,044	32.5%
1983	1,351.2	15.3%	45	12.5%	36,844	19.7%	27	3.8%	1,227	17.5%
1984	1,515.9	12.2%	50	11.1%	40,337	9.5%	27	0.0%	1,324	7.9%
1985	1,588.6	4.8%	51	2.0%	39,742	-1.5%	25	-7.4%	1,279	-3.4%
1986	1,600.2	0.7%	50	-2.0%	38,359	-3.5%	24	-4.0%	1,208	-5.6%
1987	1,564.5	-2.2%	48	-4.0%	36,088	-5.9%	23	-4.2%	1,113	-7.9%
1988	1,601.7	2.4%	49	2.1%	37,713	4.5%	24	4.3%	1,144	2.8%

Notes: Data are based on claims processed through December 31, 1989 and include PPS waiver States. 1981 data are not available.

Source: HCFA Office of Research and Demonstrations.

Chapter 3

Impact on Hospitals

Earlier reports in this series have provided historical reviews of changes in utilization and finances of acute care hospitals. They have documented a sharp drop in length of stay and reduction in the rate of increase in Medicare operating costs in the first year of PPS, accompanied by high PPS operating margins. This was followed by increasing growth of cost and reduction of margins. Margins vary greatly among hospitals, with major teaching facilities consistently showing high PPS margins. Possible sources of cost increase are adoption and diffusion of new services, reduced pressure for cost reduction, and increased real case mix.

This chapter updates information on these trends and evaluates new evidence on sources of cost increases both over the long term and during the shorter post-PPS period. It begins with an overview of

long-run trends in hospital expenses, revenues, and margins. It then presents information on trends in Medicare PPS margins, costs, and revenues. This includes information on all hospitals and for specific groups of hospitals of interest to policymakers. The chapter also presents information on Medicare capital payments and changes in hospital investment behavior since the start of PPS.

Next, the chapter presents evidence on factors that might explain--or make more puzzling--the continuing high rate of increase in hospital costs in the period since implementation of PPS. It examines information on long term changes, such as increases in the intensity of care in acute care hospitals and long term labor market and employment developments. It then focuses on developments since the implementation of PPS. These include reduced hospital cost control activity, changes in hospital productivity, case mix increase, changing hospital market structure, and increasing market power of purchasers of health care. The first three of these factors appear to have increased costs while the last two may tend to reduce costs.

<u>Long-Run Industry Trends in Expenses, Revenues, and Margins</u>

This section examines financial and economic trends based on American Hospital Association (AHA) data for all types of patients

served by hospitals. These data are useful for assessing overall hospital financial performance. Data from the AHA National Hospital Panel Survey indicate that growth in hospital expense per case has tracked revenue per case very closely for a considerable time. Over the period 1963 to 1988, expense per case grew at an average annual rate of 10.9 percent while revenue per case grew at an average annual rate of 11.0 percent, both well above the average annual consumer price index (CPI) increases for this period of 5.4 percent. The slightly higher growth rate of average revenue over average expense is reflected in a gradual upward trend in total hospital margins (revenue from all sources minus total expenses, expressed as a percent of revenue) over this period from the 2 to 4 percent levels of the 1960's and 1970's to the 4.5 to 6 percent levels of the 1980's. Table 3.1 shows the growth in patient revenue and total expense per admission adjusted for outpatient activity and total revenue operating margins. Total revenue operating margins reflect patient revenue, nonpatient revenue, and total expense. These total margins rise when the growth in patient revenue per case exceeds the growth in expense per case and fall when the opposite is true.

At the outset of PPS in 1984 revenue and expenses per case diverged when the average expense grew 7.2 percent (over 1983) while revenue per case grew 8.3 percent. Total hospital margins jumped to an all time high of 6.2 percent, compared to a 1983 level of 5.1 percent. Since that time, however, the growth in

expense per case has caught up, growing at an average annual rate of 8.8 percent from 1984 to 1988 while revenue per case grew at 8.5 percent per year. Total hospital margins accordingly peaked in 1984, falling in the 3 subsequent years to 4.7 percent in 1987. In 1988, they leveled off at 4.8 percent.

The most striking feature about the growth trends in both revenue and expense per case is that they have consistently run well above the general level of inflation. As seen above, for the period 1963 to 1988 the average annual increases in both expenses and revenues per case exceeded the average annual increase in the CPI by 5.5 and 5.6 percentage points, respectively (10.9 percent-5.4 percent and 11.0 percent-5.4 percent).

Focusing on the recent history of this phenomenon, it is possible to divide the last decade into two distinct periods for comparison purposes, 1978-1983 and 1983-1988 (the 5-year period immediately preceding PPS and the 5-year period during which PPS was phased in). During the 1978-1983 period, average annual cost and revenue per case rose respectively 12.5 percent and 12.9 percent and during the 1983-1988 period these had dropped to 8.5 percent and 8.4 percent. These decreases are not necessarily attributible to PPS, however, since the general inflation rate had fallen from an average annual rate of 8.5 percent during the earlier period to 3.4 percent during the later period. In fact, the differential between the hospital inflation rate and the

general inflation rate was actually greater during 1983-1985 (5 percent) than during 1978-1983 (4-4.5 percent). This indicates that whatever distinct inflationary pressures existed historically in the hospital sector continued into the PPS period. Several possible factors which may explain the continuing high level of hospital inflation are discussed at some length later in the chapter.

Hospital total margins have declined since their peak in 1984, the first year of PPS. They remain at historically high levels, with the 1988 value higher than the average for the entire pre-PPS period (1963-1983), the pre-PPS periods presented in Table 3.1, and any single year in the 1970s. In addition, revenues per case continue to grow more rapidly than prices in the economy as a whole, as indicated above.

Trends in PPS Margins, Costs, and Revenues

This section focuses on PPS payments for Medicare beneficiaries. Comparison of PPS operating payments with the Medicare operating costs they are intended to cover provides an assessment of how appropriately PPS has paid for the cost of Medicare beneficiary care, both in the aggregate and for various types of care. Table 3.2 presents data on PPS margins and Table 3.3 presents information on growth in Medicare operating cost per case and PPS payments per case from PPS-1 through PPS-5.

PPS operating margins are defined as PPS operating payments minus operating costs divided by PPS payments. The effects of uncompensated care, capital, and direct medical education costs are not included in the PPS operating margins.

Operating margins in the fifth year of PPS (PPS-5), essentially 1988, continued the downward trend in profitability that began in 1984 (see Table 3.2). Overall, PPS margins were 2.2 percent, compared to 6.0 percent in PPS-4. Urban margins decreased to 3.0 percent, from 6.9 percent in PPS-4, while rural margins declined to -2.4 percent from -0.6 percent in PPS-4. Although PPS margins have declined during this period, overall PPS revenues were greater than the Medicare operating costs that PPS was designed to cover.

The changes in PPS operating margins can be explained by the changes in PPS payments and costs (see Table 3.3). In 1984, the first year of PPS, margins rose dramatically compared to 1983, the year in which payment to hospitals was governed by the Tax Equity and Fiscal Responsibility Act (TEFRA). This was due largely to a 16 percent increase in PPS revenues and a substantial drop in the rate of increase in Medicare costs. In the subsequent PPS years, Medicare operating costs per case rose between 9 and 10 percent, while revenues increased much less. The rate of increase in PPS payments per case declined from 16

percent in PPS-1 to a range of approximately 4-6 percent for PPS-3 through PPS-5. As a result, PPS operating margins have declined from 14.2 percent in PPS-1 to 2.4 percent in PPS-5 (see Table 3.2).

PPS Payments

The changes in PPS payments can be described in terms of policy decisions with regard to annual updates in PPS rates and the changes in the Medicare CMI. Information on changes in the update factor are presented in Table 3.3 and information on increases in the CMI are given in Table 3.4. They indicate that updates have been reduced since the early years of PPS while CMI growth has continued. In 1988 the update factor varied by type of hospital but averaged 1.6 percent, an increase over 1986 and 1987. It contrasts with growth of a hospital market basket measure of the cost of inputs of 4.7 percent. The growth in the CMI was 3.3 percent, somewhat higher than in 1986 and 1987.

Under the PPS enabling legislation, the rates in 1984 and 1985 were set so that PPS payments equaled the amount that would have been paid under TEFRA for the year prior to the implementation of PPS. The rates were frozen at fiscal year 1985 levels from the beginning of fiscal year 1986 and increased by 0.5 percent for the last 5 months of 1986. Under the Balanced Budget and Emergency Deficit Control Act (the Gramm-Rudman-

Hollings Act), payments were also subject to a 1 percent reduction, leading to an effective 0.5 percent reduction from March 1986 through the remainder of fiscal year 1986. Table 3.3 presents the detailed history of PPS updates, with the effective dates of changes described in the notes.

OBRA 86 increased the 1987 rates by 1.15 percent. It also established separate outlier offsets, based on the experience of the urban and rural groups. This effectively reduced cross-subsidization of outlier payments from rural to urban hospitals. As a result of this adjustment, the 1987 rural rates increased by about an additional 3 percent, while the urban rates decreased by about 0.5 percent.

OBRA 87 established differential update factors for the 1988 rates for hospitals in large urban, other urban, and rural areas. We discussed this legislation in Chapter 1 (see page 1-6).

The CMI contributed to the large increase in revenues in the first year of PPS, and generally added 2 to 4 percentage points to revenue growth in subsequent years. The 1985 index was higher than the 1981 CMI used to initially calibrate the system with about one-third of the increase due to data quality and coding changes which were anticipated and offset through an adjustment to payments. Case mix increases were 4.3 percent in PPS-2, 2.8 percent in PPS-3, 2.5 percent in PPS-4, and 3.3 percent in

PPS-5. Data on the variation in case mix change appear in Table 3.4.

Operating Costs

It is possible to assess the extent of hospitals' cost reduction actions by comparing actual rates of cost growth and the rate of growth that would occur if all hospital costs were fixed (that is, they are not reduced as the number of discharges falls). Using information on hospital input cost inflation and discharge (output) change by year, it is possible to estimate the expected change in cost per discharge if hospitals take no explicit cost reduction actions. If actual observed cost per discharge increases at a slower rate, it would appear that cost reduction occurred. If actual increases equal or exceed the expected level, it would appear that more resources are being used in hospital production or that output prices are increasing more rapidly than the cost of inputs. Subject to the simplifying assumptions, it would then appear that cost reduction has not occurred.

Significant cost reduction occurred during the first PPS year. The combination of a hospital market basket increase of 5.9 percent for that year plus a 5.4 percent decline in discharges could have led to as much as a 11.9 percent increase in Medicare operating cost per case ([1+.059]/[1-.054] times the

previous cost per case). Mathematically, the change in a ratio equals 1 plus the percent change in the numerator (1+.059) divided by 1 plus the percent change in the denominator (1-.054). Instead, Medicare operating cost per case rose only 1.8 percent, creating a large cost savings. The decline in length of stay, reductions in employment, and shifts to the ambulatory and post-hospital settings, discussed elsewhere in this report, are responsible for this result.

The dramatic savings noted for PPS-1 appear to be a one time phenomenon. Using the same methodology, in PPS-2 the expected increase in Medicare cost per case was 12.8 percent while the actual increase was 10.1 percent. From PPS-3 on, actual increases exceeded expected increases. By PPS-5 the expected cost increase was 3.6 percent while the actual increase in Medicare cost per case was 9.7 percent. Overall, the increases in costs per case averaged between 9 and 10 percent from PPS-2 through PPS-5.

Variation in PPS Margins by Hospital Group

The aggregate trends in costs and revenues described above do not reveal the considerable variation in the PPS experience of different hospital groups. Overall, Medicare margins continued the descent started in PPS-3. The median Medicare operating

margin and the percent of hospitals with positive margins declined sharply from PPS-1 to PPS-5, as shown in Table 3.5.

Table 3.5 also shows that there has been wide variation in hospital performance under PPS. The difference in margins between the 90th percentile and the bottom 10th percentile has grown substantially since PPS-1. Margins at the 90th percentile declined less than 5 percentage points between PPS-1 and PPS-5. Margins at the 10th percentile dropped more than 20 percentage points for the same period. Additional analysis not shown in Table 3.5 indicates that, for the most part, hospitals that performed the best in PPS-5 have also performed well since the beginning of PPS. Among the hospitals above the 90th percentile in PPS-5, almost 80 percent had PPS-2 margins above the median, and one-third had PPS-2 margins above the 90th percentile.

There was also a substantial difference in margins between other percentiles and the 90th percentile. While the overall PPS-3 median margin was 5.9 percent, hospitals at the 90th percentile had margins of 20.1 percent. In PPS-5, the median margin dropped to -0.3 percent, but the margin at the 90th percentile remained at 18.4 percent. Since PPS-3, hospitals in the first quartile (at the 25th percentile or lower) had negative margins, with profitability deteriorating. Thus, the distribution of margins had become much more dispersed by PPS-5, as shown in Table 3.5.

With few exceptions, the groups shown in Table 3.2 followed the experience of all hospitals, with margins declining since PPS-2. Urban margins continued to be higher than rural margins, larger hospitals were more profitable than smaller hospitals, and higher occupancy hospitals had higher margins than lower occupancy hospitals.

In the following section, we discuss Medicare margins by hospital characteristic: teaching status, urban/rural location, and Medicare utilization. We also discuss margins of hospitals in Puerto Rico, which were first paid under PPS in 1988.

Teaching: Major teaching hospitals are those having more than one intern and resident for every four beds (an intern and resident to bed ratio of more than .25). Major teaching hospital margins proved to be more resistant to declines in margins than other hospitals, even though the indirect medical education (IME) adjustment was reduced in 1986. These hospitals have had the highest margins since the beginning of PPS (see Table 3.2). Their PPS-5 margins of 12.4 percent were substantially higher than the national average of 2.2 percent and but somewhat lower than their 18-20 percent margin range of PPS-1 through PPS-3.

Several factors may have played a role in keeping the major teaching margins higher than other hospitals. These include

favorable cost, occupancy, and discharge experience. In PPS-5, the increase in major teaching hospitals' Medicare operating cost 7.9 percent, compared to 10.2 percent for all hospitals. Table 3.6 indicates that major teaching hospitals had the highest occupancy rates from the start of PPS through PPS-5. During this period, their occupancy rates increased slightly from 74.2 percent in PPS-1 to 76.0 percent in PPS-5. Table 3.7 indicates that high occupancy rates tend to be associated with higher PPS margins across all hospitals.

Based on analysis not presented in the tables, the change in discharges between matched sets of hospitals in sequential years shows that major teaching hospitals experienced the slowest declines in PPS-2 and PPS-3, minor teaching hospitals showed the slowest decline in PPS-4, and major teaching hospitals showed the slowest growth in PPS-5. Nonteaching hospitals consistently show the greatest declines in the first three of these years and somewhat higher growth in PPS-5. If these pairwise comparisons are representative of all hospitals in each class, major teaching hospitals experienced cumulative discharge declines of 2.2 percent over these 4 years, less than one quarter of the 10.3 percent decline experienced by nonteaching hospitals.

Major teaching hospitals have the highest values of some factors affecting payment (e.g., CMI) and proportionately receive the most from the indirect medical education (IME) and

disproportionate share adjustments. However, even with these added revenues, their PPS revenues per case have increased at about the same rate or less than all hospitals, except in PPS-2, when their revenue increased about 1 percentage point more. In PPS-5, major teaching hospital revenue per case increased 5.9 percent compared to 5.7 percent for all hospitals. In PPS-4, their revenue per case increased 2.4 percent compared to the overall average of 4.4 percent. Thus the continued success of the major teaching hospitals can be explained by their cost behavior.

The IME adjustment was initially set at 11.59 percent, equal to 2 times an empirically estimated factor of 5.795. The adjustment factor formula was changed under COBRA in such a manner that, when the adjustment factor was multiplied by 2, a hospital which increased its ratio of interns and residents to beds from zero to 0.10 received a payment increase of 8.1 percent.[1] The adjustment formula was subsequently changed to yield a payment increase of 7.65 percent under similar circumstances by OBRA 87. The 8.1 percent factor was derived by multiplying an adjustment factor by

[1] The adjustment calculates the ratio of interns and residents to beds (IRB) as a small ratio (say, 0.001), calculates the IME adjustment from the statutory formula, multiplies it by 2 (1.89 under OBRA 87), and multiplies the result by a factor to convert the hospital's IRB to 10 percent (in this case 100=0.1/0.001). This gives an adjustment factor described as corresponding to a 10 percent increase in the IRB and actually equal to a multiple of a small change in the IRB from zero. The values are .081 (8.1 percent) under COBRA and .0765 (7.65 percent) under OBRA 87.

2 while the 7.65 percent used the same formula and a multiple of 1.89. We simulated IME payments with a multiple of 1.0 to reflect the reduction of the adjustment to 4.05 percent as included in the President's FY 1991 budget. We calculated these simulated IME payments equal to 53 percent (1/1.89) of those shown on the cost reports, which we describe as "single teaching" adjustments. Table 3.8 presents the results. Even if the IME payment had been based on the assumption of a "single teaching" adjustment, major teaching hospitals would have had PPS margins of 8.7 percent in contrast to 1.1 percent for minor teaching hospitals and 1.6 percent for nonteaching hospitals in PPS-5. Although major teaching hospitals receive approximately 20 percent of their Medicare revenue in IME payments they would still have high margins compared to other hospital groups after a change to a "single teaching" adjustment.

Rural Hospitals: Table 3.2 updates information shown in our 1987 report about the relative PPS margins of urban and rural hospitals. From the beginning of PPS, urban margins were about 5 to 7 percentage points higher than rural margins. This trend continued in PPS-5, with both urban and rural margins decreasing. In PPS-5, the overall urban margins were 2.97 percent, while rural margins averaged -2.43 percent.

Although historically larger hospitals have had higher margins than smaller hospitals since PPS-1, the pattern is now different for the smallest rural hospitals. Based on analyses reported in our 1987 report, we believe that the shift in this pattern is attributable to the completion of the transition to fully national PPS payment rates. Although margins declined in PPS-5 for all rural bed-size groups, those rural hospitals with less than 50 beds had higher margins than 50 - 99 bed rural hospitals. Table 3.2 shows the trend in margins for small hospitals compared to large.

Occupancy is a major determinant of hospital profitability. This is because with higher occupancy levels, there are more patients to absorb the fixed and semi-fixed costs. This is evident from Table 3.7, which shows that in PPS-5 higher occupancy hospitals had higher margins.

Rural occupancy levels have declined since the TEFRA year. Table 3.6 shows that rural occupancy rates were 42.8 percent in PPS-1, compared to 36.2 percent in PPS-5. While urban occupancy rates also declined after the start of PPS, they began to increase again in PPS-4. Urban occupancy levels in PPS-5 were only slightly lower than the PPS-1 levels: 57.3 percent versus 59.0 percent in PPS-1. Small rural hospitals, with under 50 beds, had the lowest occupancy rate, at about 27 percent in PPS-5.

Rural hospitals had more variation in margins by region than did urban hospitals. The Pacific region had the highest margins, 2.4 percent, while New England had the lowest margins, -13.9 percent. It should be noted that only about 2.5 percent of the nation's rural hospitals are in New England. There was considerable variation between these regions.

The rates of increase in cost per case have been almost the same for urban and rural hospitals, roughly 9-10 percent after PPS-1 and cumulatively through PPS-5 (see Table 3.3). In PPS-2 and PPS-3, the increase in revenue per case was about the same. Revenue per case increased more for rural hospitals in PPS-4 and PPS-5. Some differential in payments has resulted from more rapid case mix growth and higher PPS standard payment amounts for urban hospitals.

Concern about the urban-rural differentials has existed from the outset of PPS. In the enabling legislation, Congress mandated the Department to study the separate urban and rural payment rates and related issues. Subsequent legislation mandated reports on other urban-rural issues. These were addressed in the 1987 Report to Congress entitled Studies of Urban-Rural and Related Geographical Adjustments in the Medicare Prospective Payment System (DHHS, 1987). Based on the available evidence at the time, the report concluded that the changes made to the PPS

payment structure by OBRA 86 essentially removed any systematic biases against rural hospitals in the PPS payment formula.

However, the poor financial performance of a large number of rural hospitals has continued to focus attention on the differences in PPS payment levels to rural versus urban hospitals. OBRA 89 (P. L. 101-239) requires that HCFA prepare a legislative proposal to eliminate separate average standardized payment amounts for large urban, other urban, and rural areas. The proposal should involve a transition period beginning in fiscal year 1992 until all areas are paid under a single rate in fiscal year 1995. OBRA 89 also requires recommendations on teaching hospital, rural referral center, outlier, and other adjustments made to basic DRG payments. Recommendations are also required on other issues unrelated to geographic variation in payment amounts.

However, there is considerable evidence indicating that changes in the PPS payment formula will not solve the problems of many rural hospitals. HCFA-funded research (Hendricks et al., 1989b), which we discuss below, suggests that today's problems of rural hospitals are not new. This research indicates that these problems are due to factors such as declining utilization rather than purely locational factors.

Much of health services research on rural hospitals provides anecdotal and state-specific evidence of the problems facing these facilities after the implementation of PPS. As discussed in the 1987 report, analyses of data from the 1970s and early 1980s indicate that many post-PPS problems are the same as those faced by rural hospitals in the last 15 years or more. This suggests that although introduction of the new payment system did not cause the financial distress being experienced by many rural hospitals, it may have contributed to it.

HCFA-sponsored research over the last 2 years by the Center for Health Economics Research (CHER) has used case studies as well as analyses of secondary data to analyze the condition of rural hospitals (Hendricks et al., 1989b). We reported on first year results of this project in last year's report and highlight certain final project findings below.

Case studies of rural hospitals were conducted in nine States around the country between the fall of 1986 and the spring of 1988. Chief executive officers and others at five to eight hospitals in each of the nine study sites perceived five areas of vulnerability to financial distress and possible closure:

- o proximity to their competitors, especially urban facilities, and too small a total market;

- too great distance from an urban area and difficulty recruiting physicians;

- location in an economically depressed area which was losing population;

- location in a poverty area within a prosperous larger rural region with increased proportions of indigent and uninsured patients; and

- above-average capital costs per case associated with new facilities and as-yet unrealized utilization increases.

Hospital administrators typically raised two issues with regard to PPS: the rural/urban base rates and the State rural wage indexes. They argued that rural hospitals must meet market standards for quality of care and wage levels that hold for facilities within commuting distance for their patients and workers. For more than half of all rural hospitals the local market includes a neighboring urban area. Hendricks and her associates argue that this implies that national rural/urban base rates and State rural wage indexes hold rural hospitals to the wrong standards for costs or wage levels. The study does not, however, provide any empirical evidence of the nature of patient and labor markets of rural hospitals. In addition, although they

oppose separate urban/rural rates, hospital administrators of failing hospitals did state that receiving the urban rate would not make a significant difference to their hospitals' financial status.

As reported last year, the CHER research team found that inpatient utilization fell more in rural hospitals in the first 3 years of PPS than in urban facilities. The primary cause of this differential was a greater decline in inpatient admissions in rural hospitals. Multivariate analysis of the percent change in average operating costs per case over this 3-year period indicates the percent change in inpatient admissions had the largest single effect on costs.

Discharge declines appear to have contributed directly to hospital closures in the post-PPS period. The rate of rural and urban closures per year in nonwaivered States--those subject to PPS--in 1984-1987 was 2.75 times the rate of the first four years of the decade (1980-1983). Total rural closures increased 130 percent in the post-PPS period compared to the pre-PPS period (1980-1983). In the same periods urban closures increased 68 percent. While annual rural closures in 1986 and 1987 in these States were over 3.0 times the 1980-1983 rural average, the urban closure rate was 1.84 times the pre-PPS rate (Hendricks <u>et al.</u>, 1989b, p.9-8). Closure of both urban and rural hospitals were concentrated among hospitals with fewer than 50 beds. The

majority (85 percent) of rural hospitals are located in counties with other acute care hospitals.

Puerto Rico: In PPS-5, Puerto Rican hospitals were included under the PPS system. Prior to 1988, they were paid under the TEFRA limits. The Puerto Rican PPS rates differed from the mainland rates in that the island specific rate comprised 75 percent of the rate and a composite average mainland rate comprised the balance. Since the mainland composite rate was greater than the Puerto Rican specific rate, Puerto Rican hospitals were expected to do well under PPS. In their first year, urban Puerto Rican hospitals had margins of 5.9 percent, compared to the national urban average of 3.3 percent. The 8 rural Puerto Rican hospitals also did well, experiencing margins of 14.2 percent versus the national rural average of -2.6 percent.

Medicare Utilization: Medicare dependent, small rural hospitals are defined in section 1886(d)(5)(G) as enacted by OBRA 89 as rural hospitals that have 100 or fewer beds, depend on Medicare for no less than 60 percent of their patient days or discharges, and are not classified as sole community hospitals. Beginning with cost reporting periods beginning on or after April 1, 1990, and ending on or before March 31, 1993, these hospitals will be paid on the basis of the national rate, an adjusted 1982 hospital specific rate, or an adjusted 1987

hospital specific rate, whichever yields the highest total payments. These same provisions apply to sole community hospitals although for them the provisions are not limited to the 1990-1993 period. These high Medicare hospitals will also be eligible for volume adjustments provided for sole community hospitals. Eligibility is determined by data from fiscal year 1987 cost reports. These hospitals receive special treatment in part because they have lower margins than hospital with lower Medicare utilization. In PPS-5, hospitals with 65 percent Medicare utilization had the lowest PPS margins, as shown in Table 3.2.

Medicare dependent hospitals are also lower occupancy hospitals, which may explain in part why they are less profitable. In PPS-5, the median occupancy rate for rural hospitals, excluding hospitals with 65 percent or more Medicare days, was 36 percent. The median occupancy rate for rural hospitals with more than 65 percent Medicare days was 26 percent, almost a third less than the other rural hospitals. Medicare dependent urban hospitals also have lower occupancy rates than other urban hospitals, although the difference is much less than for the rurals (median occupancy rates in PPS-5 of 54 percent and 59 percent, respectively, for urban Medicare dependent and other urban hospitals). A recent study by ProPAC concludes that while Medicare dependent hospitals do poorly under PPS apparently factors such as low occupancy and long length of stay are

associated with this poor performance (Guterman et al., 1990). In summary, the data indicate that high Medicare utilization hospitals are also hospitals with poor length of stay and occupancy characteristics which are typically associated with low margins. The evidence does not clearly indicate that high Medicare dependence is responsible for the poor financial performance and suggests that such dependence may be simply an indicator of other factors which explain poor performance.

Medicare Capital Payments - TEFRA through PPS-5

Since the outset of PPS, there has been concern that the cost passthrough for Medicare capital-related costs would encourage excessive increases in capital costs. In the first 4 years of PPS, capital costs grew as expected at a rate faster than operating costs (see Table 3.9). In PPS-5, this upward trend leveled off, with operating costs growing at about the same rate as capital. Capital costs increased by 10.2 percent while operating costs increased by 10.3 percent.

In this section, we analyze the growth in capital costs and the effect of the cuts in capital payments mandated by OBRA 86 and OBRA 87.

The Growth in Capital Costs

Reimbursable capital costs include historical cost-based depreciation, interest, building insurance, capital leases, and taxes. These are currently paid on a reasonable cost basis. OBRA 86 and OBRA 87 reduced the payment level to 93 percent and 88 percent of costs for the first 3 months and the remainder of fiscal year 1988, respectively, and then to 85 percent of costs by fiscal year 1989.

In general this report focuses on cost per case. However, changes in the number of discharges tend to obscure changes in the level of capital cost, especially for rural hospitals. These large changes in utilization, combined with the relatively fixed level and lags in the adjustment of capacity, make a focus on capital cost per discharge misleading. Although capital investment decisions are influenced by changes in demand for hospital services, in the short run capital costs are relatively fixed. In addition, changes in capital cost per discharge tend to reflect changes in hospital output (i.e., discharges) rather than changes in investment. For example, Table 3.9 indicates that growth in total Medicare capital cost between PPS-1 and PPS-2 was approximately 14 percent for all classes of hospitals. Analysis not reflected in the table indicates that--for the same period and sample of hospitals--Medicare capital cost per case

increased 21.1 percent for all hospitals, 19.9 percent for urban hospitals, and 25.1 percent for rural hospitals. The impression of sharp capital cost increases is exaggerated by the decline in discharges, especially for rural hospitals. Although the difference in the rates of increase in urban and rural capital cost per case is less in later years, it is preferable to examine aggregate cost increases, bearing in mind the simultaneous changes in urban and rural utilization, rather than obscuring the picture by presenting a single cost per case statistic.

Under PPS, Medicare capital-related costs have risen more rapidly than operating costs. From PPS-1 through PPS-5, capital-related costs rose about 56 percent, compared to about 32 percent for operating costs. The Center for Health Policy Studies (Hadley and Zuckerman, 1990) completed a study for ProPAC that examined pre- and post-PPS hospital costs over the period 1980-1986. One conclusion of the study is that Medicare payment policy itself played a role in explaining these different rates of increase. Specifically, the study concluded that Medicare payment policy reduced spending on labor and increased spending on capital relative to what expenses would have been under cost reimbursement.

In PPS-2, capital costs increased 14.1 percent while operating costs increased at the substantially lower rate of 3.6 percent. In PPS-3 and PPS-4, operating costs continued to lag behind the

growth rate in capital costs, although capital cost growth moderated and operating costs accelerated. By PPS-5, operating costs and capital costs grew at about the same rate--a little over 10 percent.

In PPS-5, the growth rates of capital and operating costs were essentially the same for all hospital groups (see Table 3.9). This reflects a substantial change in urban-rural patterns. In PPS-2 both urban and rural capital costs grew about 14 percent, while rural operating costs decreased 0.4 percent and urban operating costs increased 4.5 percent. By PPS-5 rural capital cost growth lagged urban growth with rural growth of 8.3 percent and urban growth of 10.6 percent. However, operating costs had converged to about equal rates of 10.9 percent for rurals and 10.2 percent for urbans.

There are several possibilities which may explain the convergence of growth in total capital and operating costs for all hospitals. First, declining Medicare margins could have reduced the funds or debt capacity available for capital spending. Second, operating costs associated with new projects would not be incurred due to reduced capital expenditures. Third, the cuts in capital payment mandated by OBRA 86 and OBRA 87 may have reduced the growth in capital expenditures.

OBRA Cuts

OBRA 86 and OBRA 87 mandated reduced capital cost payments. In OBRA 86, capital payment was reduced by 3 percent. OBRA 87 increased the reduction to 7 percent between October 1, 1987, and December 31, 1987, 12 percent for the remainder of fiscal year 1988, and 15 percent for fiscal year 1989. Sole community hospitals were exempted from these cuts. Since the reductions were applied across the board, the OBRA cuts were expected to affect all hospitals equally, except for sole community hospitals. The actual results are consistent with this expectation, as shown in Table 3.10.

Sources of Cost Increase

We discuss below several possible explanations of the continuing increase in cost per case of approximately 9-10 percent per year. First we examine long-term increases in the intensity of care. We discuss developments in the labor markets in which hospitals purchase services, changes in hospital employment and labor intensity per patient, changes in hospital payroll per employee, and changes in hospital compensation. We examine evidence of reduced hospital cost containment activity and changes in use of inputs and in hospital productivity. We then turn to market factors including increasingly complicated case mix, cost-

increasing nonprice competition, and changes in the market power of purchasers of health care.

Long-Term Increases in Intensity of Care

There has been a shift away from treatment in smaller, less technologically advanced hospitals to large, highly advanced hospitals. HCFA-sponsored research by CHER (1989) which looked at this phenomenon over the period 1963-1988 showed that in 1963, 60.7 percent of hospitals had fewer than 100 beds. By 1975, this had fallen to 48.9 percent and in 1988 to 44.8 percent. At the same time, of the 24 hospital services reported as part of the AHA services survey for hospitals in 1963, 12 were no longer even reported since most had become universal among hospitals (see Table 3.11). Examples include Diagnostic X-Ray, Operating Room, and Clinical Laboratory. At the same time, 28 additional services, not available in 1963, were reported by the AHA in 1988. These reflect both a broadening of services available through acute care hospitals (e.g., Ambulatory Surgical Services, Hospice, Alcohol/Chemical Outpatient) and technological advances inherent in additional specialty care not available in 1963 (e.g., Ultrasound, Renal Dialysis, Open-Heart Surgery, Magnetic Resonance Imaging). Table 3.11 shows the number of services listed as available in 1963 and the number of additional services added after that time for 1975 and 1988.

These data indicate that both the breadth and depth of services available for patient care have been expanded. This continuing process is highly correlated with the increases in revenue and expense per case.

Labor Market Developments

Over the 25 year period 1963 through 1988, AHA Panel Survey data reveal three notable trends in hospital labor market data. First, the number of employees increased over this period, although this has leveled off in the PPS period. Second, there was an increase in intensity of labor services, which again leveled off in the PPS period. And finally, there was a striking increase in compensation for hospital employees. The latter at least partially reflects an increase in the skills needed to provide the expansion of hospital services. Table 3.12 presents results from selected years from 1963 through 1988.

Historical Changes in Employment and Employment Intensity Per Patient: One factor that helps explain the continuing increases in hospital expense per patient up through 1984 is the increased intensity of labor per patient (in part to provide the additional services described above). The number of full time equivalent employees (FTEs) rose by a factor of 2.5 from 1963 to 1983 from 1.258 million to 3.188 million, then dropped slightly during the PPS period and leveled off. In 1988 it stood at

3,112 million. While this generally reflects the number of patients served, AHA Panel Survey data show that adjusted admissions grew from 28 million in 1963 to 44 million in the period 1981-83 before falling to around 42 million in the period 1986-88. However, the change in employment also reflects the number of employees per patient as shown in Table 3.12. Labor intensity is measured by the number of FTE employees per 100 hospital patients (the number of annual patient days divided by 100 times the number of days per year), adjusted for outpatient activity, or FTEs per 100 census (see Table 3.12). This measure increased from 214 per hundred in 1963 to 400 per hundred in 1984 where it has remained with little change through 1988. Of course, this long-term increase in labor intensity does not explain what happened after 1984 when expense per patient continued to increase in spite of the leveling off of the number of employees per patient day.

Focusing more narrowly on the post-PPS period, labor inputs to hospital production showed a decline after the implementation of PPS, followed by an increase in the 1985-1988 period (see Table 3.12). In comparison to long-term trends, total FTEs grew at a 4.3 percent rate in 1973-83, then declined at a -2.3 percent 1983-85 annual rate and grew again at a 0.7 percent annual rate in 1985-1988. Bureau of Labor Statistics data on employment in private hospitals alone show similar long run patterns in total

hospital employment despite differences in definitions and types of hospitals covered (Pope and Menke, 1990).

With the faster drop in utilization than in inputs, the number of FTEs per 100 hospital patients (i.e., census) did not peak until 1986, although its historical growth rate of 2.9 percent per year for 1973-83 fell to 2.7 percent per year for the 1983-86 period before turning to -0.5 percent per year for the 1986-88 period.

HCFA-sponsored research has examined changes in hospital productivity and intensity. The AHA's HAS-MONITREND service collects information on costs and inputs at the department level. It allows analysis of input utilization at the department level for a group of approximately 2,000 self-selected hospitals. Although not a nationally representative sample, careful use of the data permits identification of the sources of cost increase at the hospital department level (Cromwell, 1990).

The analysis measures productivity by labor hours per discharge from each unit (adjusted for outpatient use). The MONITREND data indicate a brief decline or slowing in growth in this measure in numerous routine departments and ancillary service areas in the 1983-85 period followed by a return to historical growth rates in the 1985-88 period. This productivity pattern is in turn largely attributable to declining routine unit length of stay during the first period (1983-85), coincident with introduction of PPS. In

the second period (1985-1988), there was little decline in unit length of stay in medical-surgical units, where the impact of PPS would be expected to be greatest, and mixed patterns of slower declines, no change, and slight increases in unit length of stay in other areas.

Labor input per day in the medical-surgical area--basically nursing time--did not diverge greatly from the 1980-88 trend in most cases in either period. This contrasts to some slowing in growth or even decline in input per discharge in the earlier period, as discussed above. Productivity as measured by labor input per procedure showed erratic patterns across ancillaries. The combination of slower decline in routine unit length of stay and generally increasing ancillary intensity (procedures/ discharge) led to increased labor input per adjusted discharge in the 1985-88 period after a decline in the 1983-85 period.

The data suggest that much of the savings in the earlier post-PPS period has since been offset. For example, for the average hospital in the MONITREND sample, total FTEs declined by 29.0 in 1983-85 and then rose by 67.6 in 1985-88. FTEs in medical-surgical routine areas fell by 20.6 in the first period and barely increased in the second, while 20.3 FTEs were reallocated or rehired in other routine services in the second period (largely in areas excluded from PPS or in intensive care or definitive observation units). Ancillary services recovered from

a small decline to a 24.3 FTE increase after 1985 while overhead departments grew. By 1988 total FTEs and FTEs per adjusted discharge were at a new high for the 1980s.

Changes in Hospital Payroll Per FTE: Increases in hospital expense per case are also affected by increases in employee compensation, which in 1988 made up 54 percent of total hospital expense (broken down into 46 percent for payroll and 8 percent for benefits). From 1963 to 1988, payroll per FTE rose an average of 7.7 percent per year. This greatly exceeded increases in comparable compensation for the entire economy where hourly earnings rose an average of 5.6 percent per year over the same period United States Council of Economic Advisors (USCEA, 1989) p.358. A 2.1 percent continuous yearly differential over 25 years implies that hospital compensation rose to a level 69 percent greater than it would have reached had it followed the growth in compensation elsewhere in the economy. Observers speculated in the early 1970s that the higher rate of growth in hospital compensation was partially a product of catching up since these employees had traditionally had lower wages than other employees (Feldstein, 1971). Some recent evidence suggests why the growth in hospital employees' compensation continues to outstrip the growth in compensation elsewhere in the economy. As discussed in the following section, the shift of mix of occupations in the hospital, technological change, and changes in

female labor markets in which hospitals compete have contributed to hospital compensation increases.

Recent Increases in Hospital Compensation: Hospital compensation per employee has continued to grow over and above what is happening elsewhere in the economy. The differential has increased in the PPS period. From 1978 to 1983 the average annual growth in total hospital compensation per FTE according to the AHA Panel Survey was 10.2 percent compared with 7.9 percent for the growth in compensation per manhour in the nonfarm business sector (USCEA, 1989, p.360). This results in a differential for this period of 2.3 percentage points. (Unlike the 1963-1988 data cited above this differential reflects inclusion of benefits in the comparison). From 1983 through 1988, the comparable yearly increases were 7.2 percent for hospitals and 4.1 percent for the nonfarm business sector, making the differential 3.1 percentage points.

One reason for the large growth differential between the compensation of hospital employees and other workers in the economy is the marked increase in the volume of hospital services accompanied by the increased technology used in providing these services. Technological change in the provision of services can affect labor costs in two ways. First, hospitals providing additional and more technologically advanced services need more specialized and highly skilled personnel to provide these

services. Second, hospitals competing for skilled personnel are forced to pay ever larger salaries in those specialized labor markets where shortages occur. The reality may be a combination of these phenomena.

Recent HCFA-sponsored research examined the demand for nurses, who in 1987 made up 37 percent of hospital employees (Pope and Menke, 1990). The study found that the number of nurses, including registered nurses, licensed practical nurses, and ancillary nursing personnel, remained fairly constant from 1980 through 1987 at around 1.1 million. However, the percentage of more highly trained registered nurses has grown from 55.8 percent of the total to 65.0 percent (see Table 3.13).

This upward trend in the skill mix of nurses can also be seen in other occupational categories. For example, Pope and Menke note that, from 1980 to 1987, therapists as a percentage of therapists and therapy assistants and aides have risen from 50 to 61 percent. Overall, they estimate that the hospital occupation mix was upgraded by 2.9 percent from 1980 to 1987 in PPS-eligible hospitals, as measured by weighted salaries of different occupations, with weights given by the proportion of persons in each occupation for the two different years. No attempt was made to look at the upgrading of skills within occupations.

With regard to the increases in compensation for hospital employees, Pope and Menke found that the gains in compensation for hospital employees have not been uniform. The increases in compensation for different occupational classifications have differed significantly. Table 3.14 shows the growth in real hourly earnings for various categories of employees in and out of hospitals.

Hospital compensation has risen faster than compensation in the economy in general and even faster than the competing service sector (see Table 3.14). However, as noted above, some of the increase in compensation is due to the increased skill mix. Within the various occupational groupings employed by hospitals the difference is not nearly as dramatic. Except for registered nurses, compensation in hospitals has followed the service sector fairly closely on average over the period 1981 to 1989.

Registered nurses appear to be a special case, with large compensation increases in the decade of the 1980's. Two features are notable in this case, however. First, unlike other occupations, the greatest growth in compensation in real terms occurred in the latter half of the 1980's, i.e., 1985-1989. The average yearly increase in real hourly earnings for full time general duty nurses was 13.3 percent from 1985 to 1989 compared to 6.8 percent from 1981 to 1985. The increase in the latter period was a response to a registered nurse shortage as hospitals

staffed up with these more highly trained personnel. Thus, in a sense, this increase in real compensation was itself a result of the increased skill mix demanded by hospitals. Second, the increase in compensation of registered nurses, 97 percent of whom are women, follows closely, increases experienced by women in the labor market generally (Pope and Menke, 1990). Table 3.15 shows average annual real increases in the salaries of full time registered nurses compared to increases for women in other occupations in the economy.

The evidence above suggests that the compensation increases for hospital employees over what was received elsewhere can be attributed in part to the increase in hospital skill mix. However, when the earnings of specific occupations are examined, it appears that compensation increases reflect the female labor market in which hospitals compete. Moreover, the analysis does not consider upgrading that may have occurred within the occupational groupings themselves. For instance, the National Sample Survey of Registered Nurses (DHHS, 1984) also reported that the percentage of registered nurses with a baccalaureate degree or above increased from 23.6 percent in 1977 to 33.2 percent in 1984. Thus the demand for nurses with increased skills could be reflected in intraoccupational earnings change of nurses as well as in the changing mix of the nurses themselves.

Reduced Hospital Cost Control Activity

It is clear from the discussion in the previous sections that the effect of PPS on hospital utilization and cost per case appears to have been significant in the early years after implementation, with lesser effect in later years. This conclusion is supported by the Center for Health Policy Studies (Hadley and Zuckerman, 1990). Cost per case has continued at about 9 to 10 percent per year after 1985, discharge declines have moderated with an increase in 1988, and length of stay has reversed its decline with an increase in 1987.

Efforts by hospitals to control costs relaxed somewhat after the first years following implementation of PPS. In this section, we review evidence from the study of fiscal pressure and PPS implementation and discuss general trends in utilization since the introduction of PPS and draw on HCFA-sponsored research using case studies, econometric analyses of utilization. This evidence supports the picture of decreased cost containment activity by hospitals.

Last year's report presented results of HCFA-sponsored research on the behavior of hospitals under fiscal pressure. This research examined length of stay, cost, and other variables and associated them with measures of the stringency with which hospitals were paid under PPS. These studies of fiscal pressure

are not entirely consistent in all findings and are subject to methodological criticisms such as those discussed in last year's report. Interestingly, the Center for Health Policy Studies (Hadley and Zuckerman, 1990) did not find any evidence that the high Medicare margins of the first two PPS years fueled higher rates of cost increase in the later years. However, as we indicated in the 1987 report they generally support the hypothesis that, cross-sectionally, fiscal pressure exerts a cost constraining effect on hospital behavior.

One study by Hadley, Zuckerman, and Feder (Hadley et al., 1989) examined cohorts of hospitals, one in its first year on PPS in fiscal year 1985 and the other in its second year on PPS in the same fiscal year. We discussed initial results from this study in last year's report. The study found that hospitals in their first year on PPS in 1985 exhibited substantial changes in behavior, far greater than exhibited by hospitals in their second year on PPS in 1985. In particular, first year hospitals experienced larger reductions in Medicare length of stay, slower increase in total expenditures, and more rapid growth in total margins than hospitals in their second PPS year.

The study by Hadley et al. characterizes fiscal pressure with a measure of the profit or loss a hospital would incur treating PPS patients if it made no change in its behavior. As discussed in last year's report, this analysis indicates that both the level

and change in fiscal pressure are associated with cost containing results, notably reduction in Medicare length of stay. The combination of high PPS margins in early years after implementation of PPS (not discussed by Hadley et al.), strong first year and weaker second year PPS effects on hospital behavior, and lesser impact of fiscal pressure on cost containment activity after a hospital's first PPS year strongly suggest a pattern of reduced cost control behavior after early PPS years.

Additional evidence of reduced cost containment activity comes from other PPS evaluation research. As part of a large scale HCFA-sponsored evaluation of PPS, case study research was conducted in the fall of 1986 at 10 sites involving approximately 100 hospitals. These studies clarified some aspects of the ways hospitals were responding to PPS incentives after the first several years of prospective payment (Gaumer et al., 1989). In dealing with physicians, hospitals were relying on peer pressure to control length of stay. Although hospitals had initially reacted to PPS with "doom and gloom" warning meetings with their medical staffs, few of the facilities studied had continued them. Admitting practices had changed but few hospitals introduced "invasive" controls on physicians such as 100 percent preadmission review. Even as early as 1986, some of the initial behavioral response to PPS had relaxed.

Many observers anticipated that implementation of PPS would lead to an increase in admissions. Explanation of the admission decline which occurred remains a major research issue in PPS evaluation. Gaumer et al. (1989a) concluded that much of the drop in admissions for the 1983-86 period was due to technological changes, such as the shift of cataract surgery to outpatient settings, but also argued that introduction of the PRO program and changes in hospital admission practices played a role. Based on analysis of 1981-86 data, they concluded that PPS "was likely associated with a one-time reduction in admission rates, in 1985" (p.41; emphasis in original), which they link to the start of PRO operations. This is supported by results reported elsewhere by Gaumer in a study of 1982-86 admissions and length of stay trends relative to non-PPS States (Gaumer, 1989). In separate analyses of urban and rural areas a significant one-time admissions drop relative to non-PPS States appeared in 1985. The results indicate that PPS was associated with a substantial downward effect on length of stay in 1984, a positive effect relative to non-PPS States in 1985, and no relative effect in 1986.

As we have discussed in previous reports, decline in Medicare length of stay was concentrated in 1984-1985, with a stabilization in 1986 and a slight increase in 1987 (see Table 2.1). This pattern is common across all age groups and other

demographic classifications and is thus suggestive of significant hospital behavioral change.

The length of stay for patients over 65 years of age, as reported by the AHA, shows a similar pattern (see Table 3.16). This data show a pattern similar to that in the Medicare administrative data, with a sharp decrease in 1984, a slower decrease in 1985, a stabilization in 1986, and an increase in 1987.

Examination of length of stay at the level of the hospital unit provides further support for these results. HCFA-funded research using HAS-MONITREND data, discussed above, found substantial length of stay drops in the 1983-85 period but little change in the 1985-88 period for patients in routine medical-surgical, sub-acute care, pediatric, and psychiatric units. Declines continued over the entire period in obstetrics and newborn units. Although not definitive, this suggests reduced responsiveness to PPS incentives in the later period (Cromwell, 1990).

Case Mix Increase

Since the advent of PPS, acute care hospitals have treated an increasingly resource intensive patient population. This is reflected in the steady increase in the CMI, the average DRG weight of Medicare patients covered by PPS (see Table 3.4). Although the increase in the CMI reflects factors other than

increasing resource requirements, such as changes in hospital coding practices, some portion of the increase reflects an increasing costliness of hospital inpatients covered by PPS. Research sponsored by HCFA and conducted by the Rand Corporation has sought to identify the degree to which increase in the CMI reflects real increase in resource requirements. Early work found that little of the increase in the CMI from 1981 through 1984, the first year of PPS, represented true change while most reflected changes in coding practices (Ginsburg and Carter, 1986). Research reported in the 1987 report examined 1986-87 CMI change (Carter et al., 1990a). It used recoded medical record information to separate real from coding effects and concluded that two-thirds of the 2.4 percent 1986-87 estimated increase in the CMI was real while the rest was due to coding practice and Grouper software changes. Preliminary results from a similar Rand analysis of 1987-88 CMI change indicates that between one-third and one-half of the 3.3 percent estimated increase in the CMI was real (Carter et al., 1990b). The preliminary estimate of the proportion of CMI increase that is real declined from about 1.9 percent in 1986-87 to between 1.1 and 1.5 percent in 1987-88. Thus, although the proportion of change that is real has declined greatly between the years, the actual rate of real change in the CMI has changed much less.

Since DRG weights and, therefore, the CMI are directly related to inpatient resource requirements, the Rand results on real change

in the hospital industry. The standard competitive industry studied by industrial economists outside of the health care sector involves multiple firms seeking to attract customers. Competitive behavior usually involves competition in price or other terms of trade. Although all industries engage in a certain amount of nonprice competition relying on advertising, locational advantages, and other attributes of the firm or product, price competition is dominant in rivalry among for-profit, nonhealth care firms.

Competition in the hospital industry has historically differed from that in the economy at large. First, since hospital markets are generally local, hospitals typically have market power over prices and other terms of trade. Second, since hospitals obtain customers based on the decisions of physicians, they traditionally have competed for long-term affiliation of physicians rather than for customers directly. Since physicians have pecuniary and nonpecuniary goals independent of their role as a patient's agent, this can lead to hospital decisions motivated by concerns other than those necessary to attract customers. Third, most hospitals have stated goals other than seeking profit. Pursuit of these goals, such as research, and the financial necessity of competing for physicians to obtain customers encourages certain forms of nonprice competition, such as investment in new technology.

Traditional means of financing health care discourage price competition. They are conducive to nonprice competition to attract both physicians, as discussed above, and attract customers directly. Because of insurance, patients bear a small share of the cost of care and are relatively unresponsive to changes in price (Manning <u>et al.</u>, 1987). They may respond instead to perceived quality differences between hospitals and thus to non-price competition. Payment based on reimbursement of costs, predominant before the early 1980s among both private and public payers, reduced the risk to hospitals of incurring costs associated with non-price competitive behavior.

Payment methods in the hospital market have shifted away from cost-based reimbursement to various forms of prospective payment and payment arrangements which shift risk from insurers to providers (Hendricks, 1989b). The Medicare PPS is the preeminent example, although State Medicaid systems and certain Blue Cross plans now use forms of prospective payment. However, these changes in payment systems do not guarantee that hospitals will engage in price competition unless such behavior will attract patients or avoid losing them. Although prospective payment may shift risk from the insurer to the hospital, the provider may still engage in nonprice competition to attract patients and help pay costs no longer covered by reimbursement. This may result in higher costs rather than the lower prices and costs which are often presumed to be the result of competitive behavior. In some

in the CMI provide strong evidence that hospital case mix has shifted in ways that lead to higher costs per case. Independent evidence from the Rand quality of care study discussed in Chapter 2 supports this interpretation. First, clinical data was collected on Medicare patients hospitalized for five common conditions indicates that disease-specific sickness at admission increased after the introduction of PPS (Keeler et al., 1990). This supports the widespread view that hospital inpatients are more severely ill in the period after the introduction of PPS than previously. Second, explicit measures of the process of care, based on lists of actions taken to care for patients, indicate that by many measures the sample studied showed better process of care post-PPS than pre-PPS (Kahn et al., 1990b). This indicates that, despite a 24 percent reduction in length of stay, by important measures such as use of laboratory tests and radiology services, more was done for patients post-PPS. Combined with the first finding, this suggests that hospitals treated more severely ill patients and delivered more resource-intensive care in the post-PPS period. Although the decline in length of stay would still be expected to reduce costs, this severity-related increase in intensity of care would be expected to contribute to higher costs.

Changing Hospital Market Structure

One possible source of cost increase is the nature of competition

markets, this stimulus to nonprice competition may overwhelm the cost reducing incentives of the new payment systems (e.g., in high cost urban markets).

Health services researchers have studied price and nonprice competition among hospitals using a number of data sets covering hospitals in several periods. Farley, using data from the Hospital Cost and Utilization Project for the 1970s on nearly 400 hospitals, concluded that hospital competition generally increased costs (Farley, 1985). Noether, using 1977-1978 Medicare and AHA data, found that measures of competition were unrelated to price and positively associated with cost. She concluded that market structure is "a minor determinant of price or expense" (Noether, 1988, p.275).

Robinson and Luft studied competition in both the pre-1982 and later periods. In their study of the 1972-1982 period they used a cross section of 5,732 hospital in 1982, defined market areas and found that hospitals with more than 10 neighboring hospitals had costs per admission 26 percent higher than hospitals with no competitors (Robinson and Luft, 1987). They argue that their results support the hypothesis of cost-increasing nonprice competition. In their study of the 1982-1986 period they examined 5,490 hospitals to compare the effectiveness of regulatory programs in non-PPS States, the California market-oriented approach, and the remaining nonwaiver States (Robinson

and Luft, 1988). Hospitals in market areas with more competitive market structures had higher costs in 1982 and 1986 than hospitals in less competitive areas. The authors conclude that the cost-increasing effect of non-price competition became less important over the period, possibly due to cost containment efforts of various payers. Hospitals in both the non-PPS States and California reduced costs compared to the other States and hospitals with higher percentages of Medicare patients experienced lower rates of cost inflation. In both non-PPS States and California effects appear to have been greatest in the most competitive markets. In California, a positive association of competition and cost had been observed in 1982 data, suggesting cost-increasing nonprice competition. This effect had disappeared by 1986.

Zwanziger and Melnick (1988) studied the impact of the California selective contracting system using data from 1980 through 1985. They conclude that hospital competition underwent a structural change in California as a result of the enactment of selective contracting. A major concern of their paper is distinguishing the effect of selective contracting, enacted in June 1982, from PPS, enacted in April 1983. They argue that the State's hospitals competed on a nonprice basis before 1983 but turned to price competition after 1983. Melnick, Zwanziger, and Bradley (1989) updated this study and presented descriptive information indicating a drop in cost growth in 1983-85 and a rebound to just

Table 3.3

Summary Hospital Data: Changes in Medicare Cost per Case, Payments per Case, Discharges, and Market Basket Index, and Values of Update Factor by Hospital Location, PPS-1 through PPS-5

	PPS-1 1984	PPS-2 1985	PPS-3 1986	PPS-4 1987	PPS-5 1988	Cumulative % Change from PPS-1
Medicare Cost per Case						
All hospitals	1.8%	10.1%	9.2%	9.9%	9.7%	47.6%
Urban	1.6	10.1	8.9	10.0	9.5	46.7
Rural	1.6	8.9	9.6	8.8	10.6	45.9
PPS Payments per Case						
All hospitals	15.8	10.1	3.6	4.4	5.7	45.8
Urban	17.2	9.9	3.5	4.1	5.3	46.1
Rural	8.8	9.3	3.1	5.1	7.4	38.4
Medicare Discharges						
All hospitals	-5.4	-5.7	-3.6	-1.0	+1.1	-15.3
Urban	-4.9	-5.0	-3.0	-0.6	1.2	-12.8
Rural	-6.9	-7.8	-5.2	-2.3	0.9	-22.9
Medicare Market Basket Index						
All hospitals	5.9	6.375	4.27	3.7	4.7	27.5
Medicare Update Factor						
All hospitals	5.9	4.4	0.5	1.15	1.6	13.1
Large Urban	N/A	N/A	N/A	N/A	1.5	13.1
Other Urban	N/A	N/A	N/A	N/A	1.0	12.8
Rural	N/A	N/A	N/A	N/A	3.0	13.9

Notes: All calculations are performed on pairwise matched hospitals. All hospital level data calculated as hospital-weighted means. Cumulative 1984-1988 effect of update factors calculated to take account of zero updates for parts of 1986 and 1988 (October 1, 1985-April 31, 1986 and October 1-November 20, 1987, respectively), 0.4 percent update for part of 1988 (November 21, 1987-March 31, 1988), and differential update factors for hospitals in large urban, other urban, and rural areas where applicable (April 1-September 30, 1988). For cumulative calculation for all hospitals 1988 weighted average update for large urban, other urban, and rural hospitals of 1.6 percent based on Congressional Research Service calculation adjusted for zero and 0.4 percent updates prior to April 1, 1988.

Sources: Costs, payments, and discharges: Bureau of Data Management and Strategy, HCFA. Data development by Office of Research, HCFA. Update factors and market basket index: PPS Final Rules, Federal Register, January 3, 1984; August 31, 1984; September 3, 1985; September 3, 1986; September 1, 1987.

Table 3.2
(continued)

Medicare Margins by Hospital Characteristic and Year

	PPS-1	PPS-2	PPS-3	PPS-4	PPS-5
Puerto Rico					
Urban	0.00	0.00	0.00	0.00	8.37
Rural	0.00	0.00	0.00	0.00	14.24
Number of Hospitals	4,601	4,761	4,951	4,899	4,829

Notes: Table is for an unmatched set of hospitals. Urban hospitals are those located within MSAs and rural hospitals are those not located in MSAs. Minor teaching hospitals are those with a ratio of residents to beds of less than .25 while major teaching hospitals have a ratio of greater than .25. Large urban hospitals are those in MSAs with population over 1,000,000. Other urban hospitals include hospitals in other MSAs. Disproportionate share and special treatment hospitals are those which satisfy relevant PPS definitions and regulations. Medicare utilization equals Medicare patient days as a percent of total patient days.

Source: HCFA Bureau of Data Management and Strategy. Data development by HCFA Office of Research.

Table 3.2
(continued)

Medicare Margins by Hospital Characteristic and Year

	PPS-1	PPS-2	PPS-3	PPS-4	PPS-5
SCH and RRC	7.75	11.41	8.81	5.82	0.73
Type of Ownership					
Voluntary	14.72	14.90	11.10	6.78	2.70
Proprietary	14.07	13.08	8.34	3.98	-1.26
Government	11.27	11.09	6.81	3.43	2.27
Urban	15.23	15.12	11.35	6.89	2.97
Bedsize					
0 - 99	13.08	12.72	7.19	3.32	-0.76
100 - 199	13.80	13.04	8.52	4.68	1.13
200 - 299	13.88	13.30	9.37	4.45	-0.65
300 - 499	14.86	14.99	11.58	7.02	2.87
Over 400	18.28	18.34	14.54	10.21	7.31
Rural	8.44	8.93	3.43	0.56	-2.43
Bedsize					
0 - 49	6.68	6.28	-0.23	-1.29	-2.12
50 - 99	8.32	7.72	1.90	0.03	-3.06
100 - 149	8.91	7.35	2.02	-1.01	-3.25
150 - 200	8.33	9.41	5.56	2.18	-1.97
Over 200	9.30	13.09	6.97	2.78	-1.37
Special Treatment Urban Hospitals					
Urban Teaching and Disproportionate Share (DSH)	16.63	17.22	14.99	11.08	8.55
Teaching and No DSH	16.89	17.04	12.26	7.37	3.27
No Teaching and DSH	13.13	12.44	9.23	5.74	1.69
No Teaching and No DSH	13.33	12.47	7.30	2.19	-2.79

Table 3.2

Medicare Margins by Hospital Characteristic and Year

	PPS-1	PPS-2	PPS-3	PPS-4	PPS-5
National	14.16	14.20	10.26	6.00	2.19
Urban	15.23	15.12	11.35	6.89	2.97
Large Urban	15.61	15.09	11.79	6.97	2.72
Other Urban	14.79	15.16	10.79	6.80	3.26
Rural	8.44	8.93	3.43	0.56	-2.43
Teaching Status					
Non-Teaching	11.82	11.31	6.57	2.48	-1.66
Minor Teaching	15.88	15.77	11.87	7.23	3.58
Major Teaching	19.16	20.87	18.17	14.75	12.37
Disproportionate Share Hospital (DSH) Status					
Non-DSH	13.62	13.52	8.38	3.86	-0.47
Urban DSH Over 100 Beds	15.48	15.66	13.34	9.42	6.24
Urban DSH Under 100 Beds	12.81	13.39	9.96	11.31	10.54
Rural DSH	11.11	12.60	7.43	5.44	4.88
Special Treatment Rural Hospitals					
SCH/RRC Status					
Non-SCH/RRC	8.22	6.72	0.66	-1.92	-4.38
Sole Community Hospital (SCH)	6.60	6.31	1.41	-1.60	-4.04
Rural Referral Center (RRC)	9.59	13.87	8.68	4.94	1.09

Table 3.1

Average Annual Growth in Adjusted Revenue and Expense Per Case and Total Hospital Margins:
By Five Year Periods 1963-1983
and for Individual Years During PPS

Period	Average Annual Growth: Patient Revenue Per Case	Total Expense Per Case	Average Years Averaged	Total Margins
1963-68	11.5%	11.3%	1964-68	3.0%
1968-73	9.3	9.7	1969-73	2.0
1973-78	13.0	12.5	1974-78	2.9
1978-82	13.6	13.2	1979-82	4.6
1982-83	9.7	9.7	1983	5.1
1983-84	8.3	7.2	1984	6.2
1984-85	8.8	9.0	1985	5.9
1985-86	8.0	8.9	1986	5.1
1986 to 87	8.6	9.0	1987	4.7
1987 to 88	8.4	8.3	1988	4.8

Notes: Cases are defined as admissions adjusted for outpatient activity, equal to the number of admissions multiplied by the ratio of total revenue to inpatient revenue. Average total margin is total revenue operating margin, defined as total patient revenue minus total expense divided by total revenue.

Source: AHA National Hospital Panel Survey data.

OBRA 86 requires carriers to make payments for Part B surgical services based upon HCFA's Common Procedure Coding System (HCPCS). By October 1987, hospital outpatient departments began coding these procedures using HCPCS, which is based upon the American Medical Association's (AMA) Current Procedural Terminology, Fourth Edition (CPT-4). Since the resulting cases are not directly comparable to cases coded using ICD-9-CM in earlier years, we do not present a year-to-year comparison in this report.

enrollee basis, the increase was also 6.1 percent. Total clinic visits by Medicare patients in 1988 were estimated to be 6.7 million, up 3.9 percent from 1986. Per enrollee, the increase was 3.9 percent compared to 1987.

Table 3.17 compares Medicare hospital outpatient payments to payments for all Medicare services and Medicare hospital services in particular. Especially noteworthy are the average annual rates of growth over the pre-PPS and post-PPS periods. These rates partly reflect general economy-wide inflation in certain pre-PPS years, but clearly show growth of outpatient services far outpacing the growth of hospital inpatient services.

We also examined outpatient data from the AHA's National Hospital Panel Survey for all patients in general community hospitals. For these patients, emergency room visits in 1988 totaled 91.9 million, up 4.4 percent from 1987; clinic visits in 1988 totaled 50.4 million, up 5.7 percent from 1987. The average revenue generated per clinic visit increased from about $113 in 1987 to almost $126 in 1988, an increase of 11.5 percent.

It is difficult to draw definitive conclusions about the role of PPS in the growth of outpatient hospital services. Since these services continue to be paid according to reasonable-cost principles, the incentive was created for hospitals to provide more services in outpatient departments. And the diffusion of

found) but that higher HMO enrollment is associated with lower hospital costs (Hendricks, 1989a).

Research using surveys conducted by the HIAA has identified changes in the health insurance and payment system between 1987 and 1988. Enrollment in HMOs increased from 16 to 18 percent while enrollment in PPOs stayed at 11 percent of the population covered by employer-sponsored health insurance. Enrollment in managed fee-for-service--conventional insurance with preadmission certification review--increased from 32 to 43 percent. The result of these changes was a decline in the unmanaged fee-for-service market share from 41 to 28 percent of the employer-sponsored health insurance market (Gabel, DiCarlo, Fink and deLissovoy, 1989). This indicates a substantial increase in the scope of private sector cost containment efforts in 1988. However, as noted above, the effectiveness of these efforts and their effect on hospital competition remains unknown.

Outpatient Services

In 1988, there was continued growth in the delivery of outpatient services for Medicare beneficiaries. Total emergency room visits by Medicare patients in 1988 was estimated to be over 9.2 million, up 6.1 percent from 1987. On a per Medicare

new technologies and changing practice patterns have enabled hospitals to do so. Furthermore, utilization review efforts have encouraged the use of outpatient rather than inpatient services. Table 3.18 presents HAS-MONITREND data from 1,500 to 2,000 hospitals on percentage changes over time in the share of various ancillary departments' total revenue generated on an outpatient basis (Cromwell, 1990). It indicates how important the outpatient department has become in the delivery of diagnostic ancillary services. With the exceptions of therapeutic radiology, catheterization laboratory and hemodialysis, the post-PPS period shows fairly large percentage changes in the share of most ancillary departments' total revenue generated on an outpatient basis.

Growth in the numbers of Medicare certified ambulatory surgical centers continues, as can be seen in Table 3.19. Ambulatory surgical centers were added as Medicare providers in 1980, and this has likely increased the interest in and acceptance of ambulatory surgery among hospitals as well.

In last year's report, we compared the utilization of selected surgical procedures by both inpatient and outpatient Medicare beneficiaries on an ICD-9-CM code specific basis. Such a comparison between pre-PPS and post-PPS years--particularly 1987--has become problematic. New coding requirements were mandated by the OBRA 86 (P.L. 99-509). Section 9331(d) of

sophisticated model which analyzes the determinants of formation of Blue Cross HMOs and PPOs.

The model of the formation of HMOs and PPOs indicates that Blue Cross has established HMOs in areas of high Blue Cross utilization and hospital payments while PPOs are established in areas of lower utilization and payments. Using predicted HMO and PPO shares of plan membership in models to explain utilization and payments indicates that PPS produced results similar for the 1981-87 period as those reported in the 1987 report for the 1980-86 period using a simpler model. PPS appears to have reduced most measures of Blue Cross under-65 inpatient and total utilization and payments.

As we reported in the 1987 report, certain private cost control measures (e.g., concurrent utilization review) appear to have reduced Blue Cross utilization and payments using the new model and 1981-87 data. PPOs reduce inpatient utilization as well as inpatient and total payments per member. However, HMOs have no effect on total payments per member (inpatient plus hospital outpatient). The reported results on HMOs may reflect Blue Cross marketing strategies or adverse selection. They are consistent with some published studies (Scheffler et al., 1989, pp.142-143) but not with results reported by Hendricks for the TEFRA year indicating that HMOs enter high cost markets (as Blue Cross

24 percent. By contrast, self-administered, third-party administrator, and independent plans--largely self-insurance--increased from 9 to 36 percent. Since Blue Cross and commercial insurers administer some partially or fully self-insured plans, the decline in their market shares may understate the decline in their indemnity insurance business and conceal some of the increase in self-insurance (DiCarlo and Gabel, 1989). This increase in self-insurance, accompanied by increased use of cost containment measures and health maintenance organization (HMO) and preferred provider organization (PPO) options, has changed markets for hospital services from reimbursement of costs in the 1970s to an environment in which employers play an active role and have a variety of means to affect hospital pricing and behavior. Whether they have acted effectively to induce price competition or limit nonprice competition remains uncertain (Morrisey and Jensen, 1989; Rice, Gabel, and deLissovoy, 1989; DiCarlo and Gabel, 1989, especially pp.87-88).

The Blue Cross and Blue Shield Association has conducted research sponsored by HCFA to examine the impact of PPS and of Blue Cross plan cost containment policies on plan payments and utilization (Scheffler et al.,1989) The researchers constructed econometric models using pooled time series-cross section data on Blue Cross plan members under 65 years of age for the years 1980-1987. We reported results for the 1980-1986 period in the 1987 report. In this report we update the results through 1987 using a more

explain the return of cost and utilization to trend growth after the initial impact of PPS. Hendricks' finding of greater 1982-1984 than 1982-1986 reduction on urban utilization in less concentrated areas supports this rebound effect. However, the evidence is limited.

<u>Increasing Market Power of Purchasers of Health Care</u>

A factor conducive to price competition has been the increasing role of payers for hospital care. Before the early 1980s, insurers and employers, the major private payers for hospital care, paid for care on a cost reimbursement basis and were rarely active in seeking to control costs. We have discussed changes in the role of these payers in the 1985, 1986, and 1987 reports. We update our findings below as pertinent to changes in the hospital market. To the extent that the role of payers has been strong, lasting, and effective, it may result in lower hospital costs. To the extent that it is ephemeral or ineffective, it may have little effect. We present the results of HCFA-funded and independent research which suggests significant effect.

Recent research using survey data from the Federal Government and the Health Insurance Association of America (HIAA) analyzes changes in the health insurance market between 1977 and 1987. Commercial and Blue Cross market shares of group insurance were 53 and 38 percent, respectively, in 1977 but by 1987 were 40 and

between rural and urban hospitals. Urban hospitals in less concentrated areas showed greater length of stay reduction in the short run (from TEFRA to PPS-1) with no effect over the longer period (from TEFRA to PPS-3). By contrast, rural hospitals show no effect in the first period while by the third year of PPS more concentrated markets showed lower declines or even increases in length of stay. This is consistent with the finding from the discussion of hospital costs. In that analysis, rural duopoly markets showed more rapid rates of cost inflation, as one would expect in facilities which were less successful in controlling length of stay.

In conclusion, Hendricks found that both urban and rural markets show evidence of cost-increasing nonprice competition in the TEFRA year, consistent with Robinson and Luft's results for 1982. However, in her time series analysis, Hendricks found that less concentration and presumably less nonprice competition does not appear to be associated with greater cost reduction from TEFRA to PPS-3 (except for rural duopoly markets). The only exception is the greater reductions of length of stay in less concentrated urban markets during the first year of PPS. These results, which are generally consistent with the other national studies discussed, indicate that nonprice competition plays a role in generating high hospital costs. However, they do not suggest that changes in price or nonprice competition explain continuing cost increases over time. Nonprice competition could conceivably

monopoly and duopoly markets had approximately the same costs but were less costly than less concentrated markets.

Most of the research reported so far consists of cross-sectional evidence and generally finds a cost-increasing effect of competition. Of greater interest in understanding the sources of continuing hospital cost increases is the effect of competition on the rate of increase, rather than the level, of cost. Hendricks's study examined post-PPS cost changes from the TEFRA year to PPS-1 and to PPS-3--approximately 1982-1984 and 1982-1986, respectively. Urban hospitals show no effect of concentration on cost change in either period. Rural hospitals show different effects in the two periods. In the first, there is no effect of concentration on rural cost change. In the second, there is greater inflation in rural duopoly markets than in either more concentrated monopoly or other, less concentrated markets. California hospitals did not differ from those in other states, a result which contrasts with those reported by Robinson and Luft (1988) and Zwanziger and Melnick (1988).

Hendricks explored whether cost reduction might be explained by an impact of concentration on length of stay. She hypothesizes that high cost hospitals in markets with more rivals reduce costs by reducing utilization. As in her analysis of cost change she finds different results in early PPS and longer periods and

below pre-1983 rates for 1986-87. Revenue growth also rebounded and did so to a greater extent in less competitive markets.

In HCFA-supported research, Hendricks used national data to examine market structure and the effects of competition (Hendricks, 1989a). She documented the concentration of local markets with separate attention to urban and rural areas. The median number of rural hospitals in a county was 1 in 1985 in both non-PPS and PPS States while the median number of urban hospitals per MSA was 5 in PPS States and 7 in non-PPS States. Using the Herfindahl index of market concentration, defined as the sum of squared market shares, Hendricks calculated the number of equal market share hospitals consistent with the value of the index for any area. The Herfindahl indexes for PPS urban areas are consistent with 3-4 hospitals per MSA and 1 per rural area. The median number of urban hospitals was 5 and the median number of rural hospitals was 1 per market. Since the Herfindahl index would be lower than observed if all hospitals in a 5 hospital market were of equal size, Hendricks concluded that urban hospital markets show some degree of concentration.

Hendricks examined the effects of concentration on Medicare costs in the TEFRA year. Urban hospitals in more concentrated markets had lower costs, although markets ranging from monopoly to 10 firms had the same level of costs. Rural hospitals in

Table 3.4

Medicare Case Mix Index Trends By Hospital Group

Hospital Group	Case Mix Index FY84	PPS Stays FY85	FY86	FY87	PPS FY88	Percentage Difference PPS FY84-85	PPS FY85-86	PPS FY86-87	PPS FY87-88	FY84-88
All hospitals	1.1331	1.1813	1.2147	1.2449	1.286	+ 4.3	+ 2.8	+ 2.5	+ 3.3	+ 13.5
Urban	1.1701	1.2204	1.2564	1.2879	1.3325	+ 4.3	+ 2.9	+ 2.5	+ 3.5	+ 13.9
o <100 beds	1.0319	1.0683	1.0944	1.1206	1.1562	+ 3.5	+ 2.4	+ 2.4	+ 3.2	+ 12.0
o 100-404 beds	1.1442	1.1910	1.2219	1.2501	1.2971	+ 4.1	+ 2.6	+ 2.3	+ 3.8	+ 13.4
o 405-684 beds	1.2264	1.2884	1.3326	1.3669	1.4093	+ 5.1	+ 3.4	+ 2.6	+ 3.1	+ 14.9
o 685+ beds	1.2887	1.3413	1.3904	1.4273	1.4664	+ 4.1	+ 3.7	+ 2.7	+ 2.7	+ 13.8
Rural	1.0345	1.0662	1.0878	1.1101	1.1378	+ 3.1	+ 2.0	+ 2.1	+ 2.5	+ 10.0
o <100 beds	0.9967	1.0205	1.0340	1.0487	1.0654	+ 2.4	+ 1.3	+ 1.4	+ 1.6	+ 6.9
o 100-169 beds	1.0445	1.0778	1.1029	1.1258	1.1576	+ 3.2	+ 2.3	+ 2.1	+ 2.8	+ 10.8
o 170+ beds	1.0851	1.1274	1.1544	1.1832	1.2184	+ 3.9	+ 2.4	+ 2.5	+ 3.0	+ 12.3
New England	1.1610	1.1876	1.2428	1.2662	1.3024	+ 2.3	+ 4.6	+ 1.9	+ 2.9	+ 12.2
Mid-Atlantic	1.1527	1.1856	1.2087	1.2359	1.2793	+ 2.9	+ 1.9	+ 2.3	+ 3.5	+ 11.0
South Atlantic	1.1267	1.1736	1.2063	1.2477	1.2994	+ 4.2	+ 2.8	+ 3.4	+ 4.1	+ 15.3
E. No. Central	1.1276	1.1741	1.2112	1.2373	1.2729	+ 4.1	+ 3.2	+ 2.2	+ 2.9	+ 12.9
E. So. Central	1.0706	1.1163	1.1408	1.1644	1.2058	+ 4.3	+ 2.2	+ 2.1	+ 3.6	+ 12.6
W. No. Central	1.1366	1.1916	1.2282	1.2563	1.2900	+ 4.8	+ 3.1	+ 2.3	+ 2.7	+ 13.5
W. So. Central	1.1054	1.1583	1.2047	1.2416	1.2791	+ 4.8	+ 4.0	+ 3.1	+ 3.0	+ 15.7
Mountain	1.1608	1.2185	1.2456	1.2697	1.3016	+ 5.0	+ 2.2	+ 1.9	+ 2.5	+ 12.1
Pacific	1.1980	1.2503	1.2745	1.3014	1.3484	+ 4.4	+ 1.9	+ 2.1	+ 3.6	+ 12.6
Major Teaching	1.2780	1.3427	1.3875	1.4231	1.4686	+ 5.1	+ 3.3	+ 2.6	+ 3.2	+ 14.9
Other Teaching	1.2137	1.2600	1.3028	1.3335	1.3734	+ 3.8	+ 3.4	+ 2.4	+ 3.0	+ 13.2
Non-Teaching	1.0837	1.1251	1.1516	1.1798	1.2211	+ 3.8	+ 2.4	+ 2.4	+ 3.5	+ 12.7
Not-for-Profit	1.1552	1.2046	1.2396	1.2697	1.3091	+ 4.3	+ 2.9	+ 2.4	+ 3.1	+ 13.3
Proprietary	1.0892	1.1363	1.1657	1.1993	1.2584	+ 4.3	+ 2.6	+ 2.9	+ 4.9	+ 15.5
Government	1.0806	1.1263	1.1555	1.1834	1.2171	+ 4.2	+ 2.6	+ 2.4	+ 2.8	+ 12.6
Dispropor. Share	1.1621	1.2150	1.2473	1.2788	1.3268	+ 4.6	+ 2.7	+ 2.5	+ 3.8	+ 14.2
Rural Ref. Ctrs.	1.1128	1.1571	1.1823	1.2091	1.2424	+ 4.0	+ 2.2	+ 2.3	+ 2.8	+ 11.6
Sole Community	1.0579	1.0868	1.1027	1.1283	1.1557	+ 2.7	+ 1.5	+ 2.3	+ 2.4	+ 9.2

Note: Based on discharges paid under PPS for all facilities included under PPS on September 30, 1984. Discharges from PPS exempt facilities and special units and all discharges in New York, Maryland, New Jersey or Massachusetts are excluded. Data in this table are based on bills processed by HCFA through December 1988, and are thus preliminary and subject to revision. FY84 CMI data have been adjusted to be comparable to CMI data for FY 85-87. This adjustment (see Federal Register, V. 49, No. 170, August 31,1984, p. 34771) reflects the FY85 reduction in DRG relative weights of 1.05% to meet the TEFRA budget neutrality requirement.

Source: Health Care Financing Administration, Bureau of Data Management and Strategy.

Table 3.5

Distribution of Medicare Margins by Percentile

Hospital Distribution	PPS-1	PPS-2	PPS-3	PPS-4	PPS-5
10th percentile	-5.3	-6.6	-14.8	-21.3	-26.3
25th percentile	3.7	2.5	-3.1	-8.1	-11.6
50th percentile	11.3	10.9	5.9	2.3	-0.3
75th percentile	17.7	17.9	13.7	11.0	9.8
90th percentile	22.8	24.0	20.1	18.4	18.4
Profitability					
Percent with positive margins	82.2	80.4	67.2	56.3	49.4
Total number of hospitals	4,742	4,836	5,023	4,912	3,845

Source: Medicare Cost Reports, Bureau of Data Management and Strategy, HCFA. Data development by Office of Research, HCFA.

Table 3.6

Mean Occupancy Rates by Year

	PPS-1 1984	PPS-2 1985	PPS-3 1986	PPS-4 1987	PPS-5 1988
National					
All hospitals	51.0%	47.5%	47.1%	47.1%	46.9%
Urban	59.0	56.0	55.9	56.3	57.3
Rural	42.8	38.8	37.5	37.0	36.2
Teaching Status					
Non-Teaching	47.6	43.8	42.8	42.5	42.4
Minor Teaching	64.4	62.3	63.1	64.2	65.1
Major Teaching	74.2	72.5	72.7	74.9	76.0

Notes: All calculations are performed on an unmatched set of hospitals. Data are hospital hospital-weighted means.

Sources: Bureau of Data Management and Strategy, HCFA. Data development by Office of Research, HCFA.

Table 3.7

Medicare Margins by Selected Occupancy Rate Groups

	Low		High	
	0 - 20%	40 - 50%	60 - 70%	80 - 100%
PPS-1	6.1%	11.6%	14.7%	14.4%
PPS-2	4.1	11.7	15.3	16.5
PPS-3	-4.2	6.6	9.7	17.0
PPS-4	-8.9	1.4	5.2	13.9
PPS-5	-14.4	-2.7	1.2	10.9

Source: Medicare Cost Reports, Bureau of Data Management and Strategy, HCFA. Data development by Office of Research, HCFA.

Table 3.8

Medicare Margins by Hospital Teaching Status:
Actual PPS-5 Margins and Estimated Single Teaching Margins

	PPS-5 Margins	PPS-5 Margins Adjusted for Single Teaching
Non-teaching	-1.6	-1.6
Minor teaching	4.1	1.1
Major teaching	16.3	8.7

Notes: Margins are Medicare operating margins. Table is for an unmatched set of hospitals. PPS-5 margins are calculated from actual data. Single teaching values assume an IME adjustment of 4.05 percent. Minor teaching hospitals are those with a ratio of residents to beds of less than .25 while major teaching hospitals have a ratio of greater than .25.

Source: Actual PPS-5 margins: Medicare Cost Reports. Single teaching margins: estimated by HCFA ORD. HCFA Bureau of Data Management and Strategy. Data development by HCFA Office of Research.

Table 3.9

Increase in Medicare Operating and Capital Costs
For a Matched Set of PPS-1 through PPS-5 Hospitals

	PPS-2		PPS-3		PPS-4		PPS-5	
	Capital	Operating	Capital	Operating	Capital	Operating	Capital	Operating
National:	14.0%	4.1%	9.2	5.7%	13.1%	8.6%	10.9%	10.2%
Urban	13.8	4.9	9.6	6.0	14.1	9.0	11.4	10.2
Rural	15.0	0.5	7.1	3.8	8.6	6.1	8.5	10.4
Teaching:								
Non	14.3	3.4	8.6	5.2	11.8	8.1	11.1	11.3
Minor	13.3	4.4	9.6	6.5	14.2	9.0	10.4	9.3
Major	15.0	7.0	11.4	4.7	17.8	9.3	11.3	7.9
Special Rural:								
SCH	16.8	0.2	10.6	2.2	6.7	5.3	6.6	6.8
RRC	13.0	3.4	9.1	7.4	12.2	10.5	10.8	12.8
Bedsize:								
Urban								
0 - 99	13.5	3.0	9.9	4.4	13.2	6.0	8.9	9.0
100 - 199	12.5	4.6	7.0	5.7	13.4	8.7	10.7	11.1
200 - 299	13.2	4.2	9.1	6.2	12.5	9.4	12.0	11.6
300 - 499	13.3	5.1	7.1	5.0	14.7	9.1	11.2	9.4
Over 500	16.1	5.5	16.4	7.8	15.1	9.3	12.0	9.8
Rural								
0 - 49	20.5	-2.0	4.2	0.9	5.2	2.2	4.0	6.4
50 - 99	16.7	-1.7	6.8	1.9	5.4	3.4	8.5	9.4
100 - 149	15.7	0.5	8.4	3.7	11.4	6.8	7.9	10.5
150 - 200	14.1	2.3	7.1	3.4	11.9	8.2	5.8	9.9
Over 200	11.0	3.0	7.2	7.9	7.9	8.9	13.1	13.3
Ownership								
Voluntary	14.0	4.2	9.0	5.9	13.4	8.5	10.9	9.7
Proprietary	11.9	4.7	9.5	5.1	10.2	10.2	9.0	14.8
Government	16.2	3.3	9.8	4.6	15.1	7.9	12.8	9.2
All Hospitals								
PPS-5 Medicare Utilization								
0 - 25%	19.0	9.2	11.7	6.7	23.4	9.8	9.3	7.1
25 - 50%	14.1	4.8	10.4	6.7	14.0	9.6	11.7	11.0
50 - 65%	13.8	2.9	7.6	3.9	11.2	6.9	9.4	9.1
Over 65%	11.3	1.3	2.8	1.3	9.9	3.7	10.5	8.0

Table 3.9
(continued)

Increase in Medicare Operating and Capital Costs
For a Matched Set of PPS-1 through PPS-5 Hospitals

	PPS-2		PPS-3		PPS-4		PPS-5	
	Capital	Operating	Capital	Operating	Capital	Operating	Capital	Operating
All Hospitals								
PPS-5 Occupancy								
0 - 20%	29.3	8.0	6.2	0.2	15.5	0.1	10.1	13.3
20 - 30%	17.2	1.6	4.8	2.9	4.4	4.0	9.5	10.4
30 - 40%	16.4	-1.4	2.1	1.5	4.1	3.6	5.9	9.1
40 - 50%	13.7	0.7	7.4	3.5	11.1	8.3	8.2	9.6
50 - 60%	12.6	2.5	7.7	5.2	11.7	7.8	9.8	11.0
60 - 70%	12.9	4.9	9.8	5.5	14.8	9.3	10.9	10.0
70 - 80%	12.6	5.5	11.0	6.8	14.1	9.2	12.9	10.3
Over 80%	23.5	6.6	11.4	7.4	15.5	8.6	12.3	10.2

Notes: Columns are labeled by year to which increase occurs (e.g., PPS-2 column presents increase from PPS-1 to PPS-2). Table is for a matched set of 3,489 hospitals for which data is available for all years. Excludes hospitals in NY, NJ, MD, and MA. Data are weighted by number of cases. Urban hospitals are those located within MSAs and rural hospitals are those not located in MSAs. Minor teaching hospitals are those with a ratio of residents to beds of less than .25 while major teaching hospitals have a ratio of greater than .25. SCH refers to sole community hospitals and RRC refers to rural referral centers as defined by PPS regulations.

Source: HCFA Bureau of Data Management and Strategy. Data development by HCFA Office of Research.

Table 3.10

Effective Capital Reductions Due to OBRA 86 and OBRA 87 Provisions by Cost Reporting Year

	PPS-3	PPS-4	PPS-5
All hospitals	1.3 %	5.0 %	12.3 %
Urban	1.3	5.1	12.5
Rural	1.2	4.5	11.1

Note: Table is for a matched set of 2,728 hospitals for which data are available for PPS-1 through PPS-5. Excludes hospitals in NY, NJ, MD, and MA. Since hospital cost reporting years overlap Federal fiscal years, the effective reduction will not equal the statutory reduction. Rural hospitals have a slightly lower effective OBRA cut because sole community hospitals were exempted by OBRA 86.

Source: Medicare Cost Reports, HCFA Bureau of Data Management and Strategy. Data development by HCFA ORD.

Table 3.11

Hospital Services Listed Available by AHA

Year:	1963	1975	1988
Services listed as available in hospitals in 1963:	24	18	12
Additional hospital services which became available after 1963:	--	13	28

Note: The number of services available after 1963 (first line, second and third columns) generally are not counted because they are universally available from all hospitals.

Source: American Hospital Association.

Table 3.12

Employment Related Statistics for Acute Care Hospitals Selected Years (1963 - 1988)

Year	Full Time Equivalent Employees (Millions)	Intensity (FTE Per 100 Adjusted Census)	Yearly Payroll Per FTE
1963	1.258	214	$3,790
1968	1.677	247	5,513
1973	2.093	285	7,495
1978	2.655	329	11,234
1983	3.188	378	18,286
1984	3.115	400	19,304
1985	3.044	408	20,645
1986	3.055	409	22,139
1987	3.077	404	24,038
1988	3.112	405	26,100

Note: Definitions:

FTE: full time equivalent employees.
Census: number of inpatient days divided by number of days in the year (365 or 366).
Adjusted census: census adjusted for outpatient activity using American Hospital Association adjustment. Adjusted census= (number of inpatient days/number of days in year)*(total hospital charges/inpatient charges).
100 adjusted census: adjusted census/100.

Source: AHA National Hospital Panel Survey data.

Table 3.13

Registered Nurses as a Percentage of All Nurses

Year	Percentage of All Nurses
1980	55.8%
1982	55.9
1984	59.8
1986	64.5
1987	65.0

Source: Gregory C. Pope and Terri Menke, "Hospital Demand for Nurses," Health Economics Research, Inc., Needham, Mass., HCFA Contract 500-88-0035, December 1989, Table 1.

Table 3.14

Average Annual Percentage Changes
in Real Average Hourly Earnings By Industry 1981 through 1989

Industry	Percentage Change
All (non-agriculture)	-0.3%
Services	0.9
Hospitals	2.4
General Duty Nurses	2.4
EEG Technician	1.5
Occupational Therapist	0.5
Medical Laboratory Technician	1.6
Dieticians	0.6
Pharmacists	1.4
Food Service	0.0

Note: The overall hospital category includes psychiatric and specialty as well as general hospitals. Specific hospital occupational categories give data for full-time workers in private hospitals in the most populous metropolitan areas. Occupational data are based on metropolitan areas reporting wages in 3 years (1981, 1985, and 1989) with area wages weighted by number of employees to calculate national values. Up to 17 metropolitan areas are used.

Source: Non-agricultural, services and hospitals: Gregory C. Pope and Terri Menke, "Hospital Labor Markets in the 1980s," Center for Health Economics Research, Inc., Needham, Mass., HCFA Contract 500-88-0035, January 12, 1990, Exhibit 2. Calculations by HCFA ORD.

Specific hospital occupations: Gregory C. Pope and Terri Menke, "Hospital Labor Markets in the 1980s," Draft Supporting Tables, Health Economics Research, Inc., Needham, Mass., HCFA Contract 500-88-0035, December 1989, Exhibit 3a. Calculations by HCFA ORD.

Table 3.15

Real Average Annual Earnings Growth:
Percentage Growth For Women
(Full Time Employment, 1980-1987)

Occupation	Growth Rate Per Year
Registered Nurse	2.1% *
All	1.8
All, College Educated	1.8
Professional Specialty	2.3
Teachers, except Post-secondary	1.8

* Includes both females and males, 1980-1988.

Note: All data are for full-time, year-round workers. All data except registered nurses are for women alone.

Source: Gregory C. Pope and Terri Menke, "Hospital Labor Markets in the 1980s," Draft Supporting Tables, Center for Health Economics Research, Inc., Needham, Mass., HCFA Contract 500-88-0035, December 1989, Table A-5. Calculations by HCFA ORD.

Table 3.16

Length of Stay of Patients 65 Years of Age or Older: 1983-1988

Year	Length of Stay Over 65	Change from Previous Year
1983	9.7	-4.0%
1984	8.9	-8.2
1985	8.8	-1.1
1986	8.8	0.0
1987	8.9	1.1
1988	8.8	-1.1

Source: AHA National Hospital Panel Survey, 1982-1988.

Table 3.17

Benefit Payments for Medicare Beneficiaries and Hospital Outpatient Payments as a Percent of All Payments, by Selected Years 1974-87

Year	Amount of benefit payments in millions for: All Medicare services	Total hospital services	Hospital inpatient services	Hospital outpatient services	Hospital outpatient payments as a percent of: All Medicare payments	Total hospital payments	Hospital inpatient payments
1974	$12,417	$ 9,180	$ 8,741	$ 4339	3.5	4.8	5.0
1980	35,699	26,017	24,082	1,935	5.4	7.4	8.0
1983	49,443	40,594	37,206	3,388	6.9	8.3	9.1
1984	62,918	44,185	40,735	3,450	5.5	7.8	8.5
1985	70,333	49,010	44,706	4,304	6.1	8.8	9.6
1987	80,316	52,345	46,442	5,903	7.3	11.3	12.7
Growth rates:							
1974-87	15.4	14.3	13.7	22.1	---	---	---
1974-83	23.1	21.3	20.4	33.5	---	---	---
1984-87	8.5	5.8	4.5	19.6	---	---	---

Note: Growth rates calculated as average annual rates of growth (percent).

Source: Health Care Financing Administration, Bureau of Data Management and Strategy and Office of the Actuary, Office of Medicare Cost Estimates.

Table 3.18

Change in the Share of Selected Ancillary Departments' Total Revenue Generated on an Outpatient Basis: 1980-83 and 1983-88

Department	Percent Change 1980-1983	Percent Change 1983-1988
Diagnostic Radiology	1.5	35.8
Therapeutic Radiology	6.5	7.8
Cat-Scan	2.8	32.0
Catheterization Lab	57.1	12.5
Lab and Blood Bank	5.1	63.0
ECG and EEG	13.4	63.2
Respiratory Therapy	9.1	95.4
Physical Therapy	2.5	50.2
Hemodialysis	-11.4	-13.7

Source: AHA/HAS MONITREND Data Books, 1980-1988.

Table 3.19

Number of Medicare of Certified Ambulatory Surgical Centers: Selected Years: 1983-1989

HCFA Region	1983	1985	1987	1989
I (Boston)	0	10	33	39
II (New York)	4	6	39	59
III (Philadelphia)	5	19	59	91
IV (Atlanta)	31	90	153	205
V (Chicago)	16	42	96	131
VI (Dallas)	0	65	118	157
VII (Kansas City)	10	20	32	40
VIII (Denver)	5	24	35	47
IX (San Francisco)	16	124	242	300
X (Seattle)	0	29	44	59
Totals	87	429	851	1,128

Note: Totals for 1983, 1985, and 1987 are for calendar years ending December 29. Total for 1989 is the total as of October 4, 1989.

Source: HCFA/Health Standards and Quality Bureau, Medicare and Medicaid Automated Certification System.

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REPORT TO CONGRESS

THE IMPACT OF THE MEDICARE HOSPITAL PROSPECTIVE PAYMENT SYSTEM

1989 ANNUAL REPORT

Louis W. Sullivan, M.D.
Secretary of Health and Human Services
1992

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GLOSSARY OF TERMS

AHA	American Hospital Association
ALJ	administrative law judge
ASPE	Assistant Secretary for Planning and Evaluation
CMI	case mix index
COBRA	Consolidated Omnibus Budget Reconciliation Act
CPI	consumer price index
CY	calendar year
DHHS	Department of Health and Human Services
DRG	diagnosis related group
DSH	disproportionate share hospital
ESRD	end-stage renal disease
FTE	full-time equivalent
FY	fiscal year
GNP	gross national product
GPPP	group practice prepayment plan
HCFA	Health Care Financing Administration
HHA	home health agency
HI	Medicare Hospital Insurance
ICF	intermediate care facility
IME	indirect medical education
LTC	long term care
LOS	length of stay
MCCA	Medicare Catastrophic Coverage Act
MGCRB	Medicare Geographic Classification Review Board
OBRA	Omnibus Budget Reconciliation Act
P.L.	public law
PPS	Medicare prospective payment system
PRO	Peer Review Organization
ProPAC	Prospective Payment Assessment Commission
RRC	rural referral center
SCH	sole community hospital
SMI	Medicare Supplemental Medical Insurance
SMR	standardized mortality ratio
SNF	skilled nursing facility

EXECUTIVE SUMMARY

This is the final annual report by the Department of Health and Human Services describing and assessing the impact of the Medicare hospital Prospective Payment System (PPS). This report updates the trend information presented in earlier reports regarding Medicare benefit payments, Medicare hospital margins, Medicare costs and payments per case, and the Medicare case mix index. It summarizes the major revisions to PPS payment rules that occurred from fiscal year (FY) 1988 through FY 1992. This year's report provides a 28-year overview of the hospital industry's revenues, expenses and employment. It also presents information on post-hospital care by examining trends in skilled nursing facility and home health care utilization. Lastly, a special report, which appears in the appendix, summarizes findings from 7 years of research on the effects of PPS on the overall health care industry, hospitals' financial status, hospital practice patterns, quality of care, and other topics.

Among the most notable findings is that in 1989 the hospital industry as a whole was in sound economic condition. For the last decade, total hospital margins have been steady, averaging just under 5 percent, except for the first 2 years of PPS, when they peaked at about 6 percent. Since the 1960's, there has been extraordinary growth in hospital employment both in absolute terms and in relationship to the rest of the economy.

With respect to Medicare margins, there has been wide variation in the performance of hospitals under PPS. As the overall Medicare margins have declined from PPS-1 to PPS-6, hospitals with relatively low margins have experienced much greater declines than hospitals with relatively high margins. For the first time since the beginning of PPS, the national average Medicare margin was negative, i.e., -0.55 for PPS-6.

Although PPS can claim responsibility for reducing the rate of growth of Medicare inpatient costs in the early years of PPS, it has not been able to sustain this effect in the later years of PPS. Since 1985, Medicare inpatient operating costs per discharge have risen at about the same annual rates that prevailed before the implementation of PPS, i.e., about 9-10 percent. However, there has been no acceleration in the rate of Medicare cost growth to make up for the low rates of growth that occurred in the first two years of PPS. The research conducted to date has involved the early years of PPS and therefore, the full impact since Medicare margins have dropped is not yet fully understood.

The Medicare case mix index, i.e., the measure of the average relative costliness of cases treated by a hospital compared with

the national average cost of all Medicare hospital cases, has increased steadily since the beginning of PPS. Recent case mix index increases have added from 2-4 percentage points to annual revenue growth since PPS-2. Other findings in the report and the appendix summarize the evidence showing that PPS has not been associated with problems in the quality of care.

Chapter 1

Introduction

This is the final annual report by the Department of Health and Human Services (DHHS) to describe and assess the impact of the Medicare hospital Prospective Payment System (PPS). PPS was enacted by Congress in the Social Security Amendments of 1983 (Public Law (P.L.) 98-21). Section 603(a) of that legislation requires the Secretary of Health and Human Services to:

> "...study and report annually to the Congress at the end of each year (beginning with 1984 and ending with 1987) on the impact, of the payment methodology under Section 1886(d) of the Social Security Act during the previous year, on classes of hospitals, beneficiaries, and other payors for inpatient hospital services, and other providers, and, in particular, on the impact of computing DRG [diagnosis-related group] prospective payment rates by census division, rather than exclusively on a national basis."

Each annual report is also to include recommendations for such changes in legislation as the Secretary deems appropriate.

In the Omnibus Budget Reconciliation Act (OBRA) of 1986 (P.L. 99-509), Congress extended the mandate for the annual reports through 1989. Section 9305(i) of OBRA 1986 requires that beginning with the 1986 report, each annual report shall include:

> "(i) an evaluation of the adequacy of the procedures for assuring quality of post-hospital services furnished under title XVIII of the Social Security Act,
>
> (ii) an assessment of problems that have prevented groups of Medicare beneficiaries (including those eligible for medical assistance under title XIX of such Act) from receiving appropriate post-hospital services covered under such title, and
>
> (iii) information on reconsiderations and appeals taken under title XVIII of such Act with respect to payment for post-hospital services."

In addition, on January 17, 1991, the Agency responded to OBRA 1990 (P.L. 101-508) by reporting to Congress in detail on outpatient and ambulatory care topics. The report contained seven research studies relating to Medicare outpatient utilization and prospective payment for hospital outpatient services. Included was information on various aspects of outpatient service delivery, such as the number and pattern of beneficiary visits to outpatient departments, and the procedures performed most often. Other reports described various classification systems, such as the Ambulatory Patient Groups and the Products of Ambulatory Care and Surgery. Also included were reports on the potential use of DRGs as a classification system for hospital outpatient services, the bundling of ancillary services into payments for outpatient surgery, and an analysis of resource cost variation in 25 hospital outpatient departments.

In response to this Congressional mandate regarding the inpatient PPS, DHHS undertook a major effort to evaluate the new payment system. This evaluation effort was designed and implemented with the following objectives in mind:

- to conduct a systematic evaluation of a policy change that has had a dramatic effect on the entire health care system;
- to describe the behavioral changes occurring among the institutions and individuals that provide, use and pay for health care, particularly among Medicare providers and beneficiaries; and
- to determine, to the extent possible, the degree to which PPS is responsible for the changes observed since its implementation.

Previous Annual PPS Impact Reports reviewed changes in utilization and finances of acute care hospitals paid under PPS during the first 5 years of PPS. These reports documented declining length of stay (LOS), increasing case mix intensity, increasing capital costs, increasing operating costs and declining margins (after 2 years of high PPS margins), and (with the exception of the initial PPS year) a constant increase in Medicare inpatient cost per case of approximately 9 percent during this period. This final report will update the trend information presented in earlier reports and summarize research on PPS over the period 1983 through 1990.

The major source of data for this report is the Medicare statistical system. The Health Care Financing Administration (HCFA) collects an expansive body of data associated with the

utilization and cost of inpatient hospital services and other hospital and ambulatory care services covered by Medicare. Additional sources of data are provided by HCFA-supported contract and grant research activities. These activities have also provided many of the analyses of the impact of PPS. Finally, where appropriate, sources of data outside of HCFA are used, including other Government sources and sources in the private sector, such as the American Hospital Association (AHA).

The findings in this report incorporate the most recent data available at the time that the analyses were conducted. For some of these analyses, data for FY 1989 were available. In the absence of such data, FY 1988 data were used.

The remainder of Chapter 1 updates trends in Medicare benefit payments by major service categories (inpatient hospital, outpatient hospital, physician services, and post-hospital care services.) Chapter 1 also summarizes the major revisions to PPS payment rules for the period FY 1988 through FY 1992. Chapter 2 addresses the impact of PPS on Medicare beneficiaries, including quality of care and post-hospital care issues. Chapter 3 discusses the impact of PPS on Medicare providers of inpatient hospital care as well as on other aspects of the health care sector.

Finally, in keeping with the fact that this is the final mandated impact report, the Department commissioned a comprehensive summary of the research conducted on Medicare's PPS over the last 7 years. This summary, prepared by Abt Associates, Inc., and entitled "Published Research on the Effects of PPS: A Critical Appraisal," is attached at Appendix A.

Medicare Benefit Payments

Table 1.1 provides an overview of the estimated incurred Medicare benefit payments under both the Hospital Insurance (HI) and the Supplementary Medical Insurance Programs. Tables 1.2 and 1.3 provide dollar and percentage distributions of incurred benefit payments by type of provider from the beginning of the Medicare program through FY 1989. All of the information on Medicare benefit payments is for Federal fiscal years.

Growth in total Medicare benefit payments began to slow down somewhat in 1984. This was due mainly to the fact that PPS reduced the growth in Medicare benefit payments under the HI program. The rate of increase continued to slow until 1988, when total benefit payments rose by 8.9 percent, compared to

7.8 percent in 1987. The acceleration in the rate of increase in total benefit payments continued in 1989, when they rose by 11 percent. Inpatient hospital benefit payments were largely responsible for the higher rate of increase in total payments in 1988. However, higher growth rates and shares of total payments for skilled nursing facility (SNF) care and home health agency (HHA) care, as shown in Tables 1.2 and 1.3, fully account for the acceleration in the growth of total benefit payments in 1989 compared to 1988. As discussed later, the rise in SNF spending was related to program benefit changes under the Medicare Catastrophic Coverage Act of 1988, some of which were only in effect for 1989.

Inpatient Hospital Benefit Payments

After declining each year since 1981, the rate of growth in inpatient hospital benefit payments rose slightly faster in 1988 and 1989, by 5.6 percent and 5.8 percent respectively. This follows two of the smallest increases in the Medicare program's history: 4.8 percent in 1986 and 3.5 percent in 1987.

The percentage of total Medicare benefit payments accounted for by inpatient hospital services had begun falling before PPS--from a peak of 70.1 percent in 1972 and 1973 to 65.2 percent in 1983. By 1989, after 6 years of PPS, the share of inpatient hospital payments was at an all time low of 54.8 percent.

Outpatient Hospital Benefit Payments

Outpatient hospital benefit payments totalled almost $7.7 billion in 1989. However, after rising by 19-20 percent annually in 1986 and 1987, the growth rate declined to annual rates of 13-14 percent in 1988 and 1989. In the past, much of this increase was due to expansions in coverage for outpatient services as the Medicare program developed, such as inclusion of routine maintenance dialysis treatments in 1974.

As a percentage of total Medicare benefit payments, however, the outpatient hospital category continued its slow but steady upward trend. Roughly 8 cents of every Medicare benefit payment dollar spent in 1989 was for outpatient hospital care. Under PPS, with outpatient benefit payments growing more rapidly than Medicare benefits overall, their share of Medicare benefit payments has continued to increase--to 7.9 percent in 1989. This contrasts to 5.5 percent in 1982, before enactment of PPS.

Physician Benefit Payments

Physician services continue to be second only to inpatient hospital services in volume of Medicare benefit payments. As shown in Table 1.2, physician payments increased from $1 billion in 1967 to $26.6 billion in 1989. During the pre-PPS period, the compounded annual rate of increase was about 16 percent. The growth in benefit payments for physician care slowed during 1984 and 1985, accelerated in 1986 and 1987, and slowed again in 1988 and 1989, when the rates were 11.9 and 10.7 percent respectively.

Skilled Nursing Benefit Payments

Skilled nursing payments account for a smaller share of total Medicare benefit payments than any other major component. Benefit payments for skilled nursing care have followed an irregular pattern of growth--rising and falling for 20 years. In 1989, however, large increased growth in estimated incurred benefit payments for skilled nursing care was observed: 268 percent. This is due mainly to the new benefits paid under the Medicare Catastrophic Coverage Act (MCCA): Medicare coverage for 150 days of SNF care per calendar year and no prior hospitalization requirement for SNF services. Chapter 2 contains a clarification of SNF coverage rules that helps explain this large increase in SNF benefit payments. In 1989, however, Congress passed the Medicare Catastrophic Coverage Repeal Act of 1989 (P.L. 101-234), which eliminated the expanded SNF benefits.

Home Health Benefit Payments

Home health benefit payments grew at annual rates of 20-30 percent in the early 1980s. Since 1985, growth has slowed dramatically and in 1987, payments declined 1 percent. In 1988, however, this trend was reversed with a growth rate of 6.7 percent. Growth continued in 1989 with a rate of 16.8 percent.

Major Revisions to PPS Payment Rules, 1988-1992

Standardized Payment Amounts

In the fifth year of PPS, FY 1988, PPS payment amounts were frozen and scheduled changes in the transition percentages were delayed for the first 51 days of the fiscal year. Thus, until November 21, 1987, a hospital's base payment amount was equal to 25 percent of the hospital specific amount plus 75 percent of the Federal amount (50 percent regional and 50 percent national). For discharges occurring on or after November 21, 1987, the Federal amount was generally based on 100 percent of the national

rate. The hospital specific amount was combined with the Federal amount (25 percent hospital specific, 75 percent Federal) through the first 51 days of the hospital's cost reporting period that began during FY 1988. On the 52nd day and thereafter, the base payment amount was generally determined using 100 percent of the national Federal amount.

However, for discharges occurring on or after April 1, 1988, and before October 1, 1990, OBRA 1987 (P.L. 100-203) established a provision known as the "regional floor." OBRA 1987 required that the Federal amount for hospitals located in each geographic region shall be the higher of: (1) 100 percent of the national amount or, (2) 85 percent of the national amount plus 15 percent of the regional amount. OBRA 1990 (P.L. 101-508) extends the regional floor through September 30, 1993.

OBRA 1987 also required the Secretary to increase the PPS payment rates for FY 1989 by the market basket increase minus 1.5 percentage points for hospitals located in a rural area, by the market basket increase minus 2 percentage points for hospitals located in a large urban area, and by the market basket increase minus 2.5 percentage points for hospitals located in other urban areas. The "market basket", i.e., the hospital prospective payment input price index, is a uniform index for all hospitals and yields one price inflator for a given year. The market basket's weighing scheme (the relative importance assigned to the various expense categories) changes periodically.

Beginning in FY 1995, OBRA 1990 (P.L. 101-508) will eliminate the differential between rural and other urban standardized amounts. Until then, the law will give rural hospitals a higher update than large and other urban hospitals. Large urban hospitals will continue to have a separate standardized amount, about 2 percent higher than the amount for all other hospitals.

Furthermore, in October 1991, the Prospective Payment Assessment Commission (ProPAC) submitted a report to Congress entitled, "Rural Hospitals Under Medicare's Prospective Payment System." ProPAC found that the policies adopted by Congress had their intended effect of improving rural hospital performance. ProPAC concluded that no further across the board payment adjustments for rural hospitals are warranted until the effects of all current policies are known, including the elimination of the differential. These conclusions were also found in the Department's report to Congress entitled, "A Single Standard Rate PPS: Its Impacts and Transition."

Outliers

Outliers are cases that have either an extremely long LOS (in relation to the geometric mean LOS for the DRG) or extraordinary high costs. The Social Security Amendments of 1983 (P.L. 98-21) specified that outlier payments should approximate the marginal cost of care beyond the outlier threshold. At the outset of PPS, the marginal cost factor was established at 60 percent. Day outliers were paid an additional per diem amount for each covered day of care beyond the LOS threshold at 60 percent of the average per diem Federal rate for the DRG. Cost outliers were paid 60 percent of the difference between the hospital's cost for the discharge and the cost threshold. Extremely costly cases that also passed the day outlier criteria were paid as day outliers, even though payments as cost outliers were often much higher.

In FY 1989, HCFA refined the outlier policy to compensate hospitals more appropriately for outlier cases. First, HCFA increased the marginal cost factor that applies to cost outliers to 75 percent (90 percent for burn cases paid under the cost methodology). Second, HCFA instituted the use of hospital-specific cost-to-charge ratios to adjust charges to costs for purposes of computing cost outliers. Finally, HCFA paid day outliers that also qualified as cost outliers the higher of the day outlier payment or the cost outlier payment. Table 1.4 presents the day and cost outlier thresholds for FY 1984 through FY 1991.

Indirect Medical Education Costs

The original PPS legislation resulted in an adjustment for indirect medical education (IME) costs of 11.59 percent, which recognized the higher indirect operating costs teaching hospitals incur because of the presence of graduate medical education programs. Each hospital's individual IME payment adjustment was the product of .1159 times the quotient of a hospital's resident-to-bed ratio divided by 0.1.

Effective for discharges occurring on or after May 1, 1986 and before October 1, 1988, the Consolidated Omnibus Budget Reconciliation Act of 1985 (COBRA 85) (P.L. 99-272) lowered the IME adjustment factor from 11.59 to 8.1 percent. This change coincided with and was directly related to the introduction of disproportionate share payments. COBRA 1985 also changed the specification of the formula from a linear form to its current curvilinear form. The independent variables used were: case mix, area wages, outlier payment, urban versus rural location, and the resident-to-bed ratio. This model differed from previous versions in that variables not explicitly recognized by the payment system, notably bed size and Metropolitan Statistical

Area, were not included. It also controlled for the level of outlier payment that a hospital receives, which was not done in previous models.

OBRA 1987 reduced the IME adjustment factor from 8.1 percent to 7.7 percent, effective for discharges occurring on or after October 1, 1988, but before October 1, 1990. This change was coordinated with the expansion of disproportionate share payments. The Technical and Miscellaneous Revenue Act of 1988 (P.L. 100-647) extended the 7.7 percent factor until October 1, 1995. Finally, OBRA 90 set the adjustment at 7.7 percent for the indefinite future by eliminating the October 1, 1995 deadline.

Disproportionate Share Hospitals

The PPS makes additional payment to hospitals that serve a disproportionate share of low-income patients. The disproportionate share hospital (DSH) adjustment multiplies the prospective payment amount for an individual case by the hospital's DSH adjustment factor. COBRA 1985 (P.L. 99-272) initiated this adjustment. The adjustment levels have been revised three times since then: once in 1987 by OBRA 1987; again in 1989 by OBRA 1989; and once more in 1990 by OBRA 1990. Hospitals receive DSH payments depending upon their geographic location (urban or rural), bed size, and percentage of low-income patients. The percentage of low-income patients (or DSH percentage) is the sum of two ratios. The first is the ratio of the number of patient days attributable to patients entitled to both Medicare Part A and Supplemental Security Income (excluding those patients receiving State supplementation only) divided by the number of patient days of those patients entitled to Medicare Part A. The second ratio is the number of patient days of those patients entitled to Medicaid but not Medicare Part A, divided by the total number of patient days at the hospital.

OBRA 1986 (P.L. 99-509) authorized the Secretary to establish a separate threshold percentage of low-income patients required for rural hospitals of 500 or more beds to qualify for DSH payments. The Secretary decided to make additional payments to such hospitals on the same basis as urban hospitals with more than 100 beds. OBRA 1986 extended the DSH adjustment for discharges occurring before October 1, 1989. OBRA 1986 also required that this be accomplished in a budget neutral fashion.

OBRA 1987 extended the DSH adjustment for discharges occurring before October 1, 1990. Effective for discharges occurring on or after October 1, 1988, the upper limit on the DSH adjustment percentage (which was 15 percent at the time) for urban hospitals with 100 or more beds was eliminated. The DSH adjustment percentage was also increased from 15 to 25 percent for urban hospitals with 100 or more beds that receive more than 30 percent

of their net inpatient revenues (excluding revenues from Medicare and Medicaid) from State and local government contributions for indigent care. The Technical and Miscellaneous Revenue Act of 1988 (P.L. 100-647) extended the DSH adjustment for discharges occurring before October 1, 1995.

Effective for discharges occurring on or after April 1, 1990, OBRA 1989 (P.L. 101-239) revised the DSH payment adjustment in the following ways:

- o Urban hospitals with 100 or more beds and over 30 percent of their revenues derived from State and local government payments for indigent care, excluding Medicare and Medicaid, receive an adjustment of 30 percent;

- o Urban hospitals with 100 or more beds or rural hospitals with 500 or more beds and a disproportionate patient percentage greater than 20.2 receive an adjustment of 5.62 percent plus 65 percent of each 1 percent by which the hospital's disproportionate patient percentage exceeds 20.2 percent;

- o Urban hospitals with 100 or more beds or rural hospitals with 500 or more beds and a disproportionate patient percentage less than 20.2 but at least 15 percent receive an adjustment of 2.5 percent plus 60 percent of each 1 percent by which the hospitals's disproportionate patient percentage exceeds 15 percent;

- o Urban hospitals with fewer than 100 beds and a disproportionate patient percentage of at least 40 percent continue to receive an adjustment of 5 percent;

- o Rural referral centers (RRCs) and sole community hospitals (SCHs) with a disproportionate patient percentage of at least 30 percent receive an adjustment of 10 percent--or 4 percent plus 60 percent of each 1 percent by which the hospital's disproportionate patient percentage exceeds 30 percent--whichever is greater;

- o RRCs which are not SCHs and which have a disproportionate patient percentage of at least 30 percent receive an adjustment of 4 percent plus 60 percent of each 1 percent by which the hospital's disproportionate patient percentage exceeds 30 percent;

- o Rural SCHs with a disproportionate patient percentage of at least 30 percent receive an adjustment of 10 percent;

- Rural hospitals with 100 or more beds which are not RRCs or SCHs and which have a disproportionate patient percentage of at least 30 percent receive an adjustment of 10 percent; and

- Rural hospitals with fewer than 500 beds--which are not RRCs or SCHs and which have a disproportionate patient percentage of at least 45 percent--continue to receive an adjustment of 4 percent.

OBRA 1990 (P.L. 101-508) phases in over 4 years an increase in DSH payment for urban hospitals with over 100 beds. OBRA 1990 also made the DSH adjustment permanent.

Rural Hospitals Deemed Urban for Payment Purposes

Section 1886(d)(8)(B) of the Social Security Act provides that, if certain conditions are met, the Secretary treats hospitals located in a rural county adjacent to one or more urban areas as being located in the urban area to which the greatest number of workers in the rural county commute. Many hospitals applied for reclassification under this provision but were denied because they did not meet the specific criteria. In order to address these hospitals, Congress created the Medicare Geographic Classification Review Board (MGCRB), which has the authority to issue decisions on requests from hospitals for geographic reclassification based on the guidelines developed by the Secretary. As of August 5, 1991, 930 hospitals had been reclassified by the MGCRB for FY 1992. Since the law requires that these reclassifications be budget-neutral with regard to payments to rural and urban hospitals, the designation of a rural hospital as urban has the effect of increasing the rural standardized amount and decreasing the urban standardized amount. HCFA is currently reevaluating these reclassification criteria and examining the impact of the reclassification process.

Capital-Related Costs

OBRA 1986 reduced payment amounts for capital-related costs by 3.5 percent for portions of cost reporting periods in FY 1987, 7 percent for FY 1988, and 10 percent for FY 1989. The legislation exempted SCHs from capital-related payment reductions and regulations for 3 years. It also clarified that the Secretary may incorporate capital-related costs in PPS on a budget neutral basis effective October 1, 1987.

OBRA 1987 increased the capital payment reduction to 12 percent for FY 1988--effective on January 1, 1988--and 15 percent for FY 1989. OBRA 1987 also prohibited the Secretary from incorporating payment of capital-related costs in the PPS payment rates before October 1, 1991. However, OBRA 1987 required the Secretary to make payments for capital-related costs on a per

case, prospective basis beginning on October 1, 1991. OBRA 1989 extended the 15 percent reduction in capital-related payments for portions of cost reporting periods or discharges occurring on January 1, 1990 through the remainder of FY 1990. It also continued to exempt SCHs from capital payment reductions.

In October 1991, HCFA implemented a comprehensive prospective capital payment plan that included a 10-year transition to full prospective payment. During the transition, all hospitals with an average capital cost-per-discharge above the national average (Federal) rate may continue cost-based reimbursement (hold-harmless payments) for "old" assets acquired or obligated before January 1, 1991. Reimbursement for assets acquired after 1990 for these "high cost hospitals" is the Federal rate per discharge multiplied by the hospital's percent of new capital. Hospitals with a cost per discharge below the Federal rate, i.e., "low cost hospitals," are reimbursed per Medicare discharge a blend of their hospital-specific rate and the Federal rate. The payment blend begins at 90 percent hospital-specific and 10 percent Federal in FY 1992. The Federal portion increases by 10 percent per year until the payment becomes 100-percent Federal in FY 2001. After the transition period, all hospitals will be paid only the Federal rate.

The Federal rate is calculated from the FY 1989 discharge-weighted national average capital cost per discharge. The Federal rate is adjusted by the hospital wage index as a proxy for geographic differences in capital-related costs. Additional payment adjustments are made for teaching hospitals and DSH hospitals with 100 or more beds and hospitals located in large metropolitan areas. Hospital-specific rates are each hospital's FY 1990 average capital cost per discharge. Federal and hospital-specific rates are updated to the current year by a factor based on a 2-year average of changes in the national average capital cost per discharge, with a 2-year data reporting lag. Thus, the update factor "locks" hospitals to their FY 1990 capital cost per discharge throughout the transition period. After 1995, the update will be based on a market basket of hospital costs.

A 15-percent payment reduction will be applied to hold harmless payments, while prospective capital payments will be reduced 10 percent. Through 1995, a neutrality adjustment factor will be applied to make prospective payment on a national basis equivalent to what would have been paid under 90 percent cost-based reimbursement. An exceptions process during the transition period sets a reimbursement floor for individual hospitals at 70 percent of actual cost, with an 80 percent floor for urban hospitals with a disproportionate share over 20.2 percent and a 90 percent floor for SCHs. A hospital whose average reimbursement falls below these floors will receive exceptions payments to bring their average reimbursement up to these floors.

Table 1-1

ESTIMATED INCURRED MEDICARE BENEFIT PAYMENTS
UNDER HOSPITAL INSURANCE (HI) AND SUPPLEMENTARY MEDICAL INSURANCE (SMI)
FY 1967-89
(in $ millions)

Fiscal Year	HI Payments		SMI Payments		Total Payments	
	Amount	Percent Change	Amount	Percent Change	Amount	Percent Change
1967	2,897	----	1,109	----	4,006	----
1968	3,868	33.5	1,443	30.1	5,311	32.6
1969	4,675	20.9	1,750	21.3	6,425	21.0
1970	5,018	7.3	1,929	10.2	6,947	8.1
1971	5,623	12.1	2,090	8.3	7,713	11.0
1972	6,176	9.8	2,289	9.5	8,465	9.7
1973	6,787	9.9	2,500	9.2	9,287	9.7
1974	8,304	22.4	3,149	26.0	11,453	23.3
1975	10,381	25.0	3,928	24.7	14,309	24.9
1976	12,357	19.0	4,818	22.7	17,175	20.0
TQ*	3,307	----	1,465	----	4,772	----
1977	15,175	----	6,134	----	21,309	----
1978	17,549	15.6	7,254	18.3	24,803	16.4
1979	20,132	14.7	8,612	18.7	28,744	15.9
1980	24,268	20.5	10,469	21.6	34,737	20.8
1981	29,140	20.1	12,555	19.9	41,695	20.0
1982	34,524	18.5	14,811	18.0	49,335	18.3
1983	39,372	14.0	17,670	19.3	57,042	15.6
1984	43,141	9.6	19,867	12.4	63,008	10.5
1985	46,575	8.0	21,939	10.4	68,514	8.7
1986	48,737	4.6	25,500	16.2	74,237	8.4
1987	50,398	3.4	29,650	16.3	80,048	7.8
1988	53,465	6.1	33,735	13.8	87,200	8.9
1989	59,061	10.5	37,767	12.0	96,828	11.0

* Transitional quarter to adjust for change in start of Federal fiscal year from July 1 to October 1 in 1976.

Note: Payments on an incurred basis by type of provider are estimated and subject to change as more recent data become available and estimates are revised.

Source: Health Care Financing Administration, Office of the Actuary.

Table 1-2

ESTIMATED INCURRED MEDICARE BENEFIT PAYMENTS BY TYPE OF PROVIDER
FY 1967-89
(in $ millions)

Fiscal Year	Inpatient Hospital		Outpatient Hospital 1/		Physicians 2/		Skilled Nursing		HHA 3/	
	Amount	Percent Change	Amount	Percent Change	Amount	Percent Change	Amount	Percent Change	Amount	Percent Change
1967	2,729	----	25	---	1,049	----	147	----	34	----
1968	3,464	26.9	43	72.0	1,343	28.0	361	145.6	69	102.9
1969	4,200	21.2	79	83.7	1,613	20.1	416	15.2	94	36.2
1970	4,663	11.0	114	44.3	1,739	7.8	294	-29.3	99	5.3
1971	5,355	14.8	148	29.8	1,869	7.5	216	-26.5	85	-14.1
1972	5,937	10.9	171	15.5	2,037	9.0	180	-16.7	91	7.1
1973	6,513	9.7	193	12.9	2,206	8.3	203	12.8	116	27.5
1974	7,945	22.0	381	97.4	2,641	19.7	255	25.6	152	31.0
1975	9,943	25.1	538	41.2	3,194	20.9	280	9.8	245	61.2
1976	11,808	18.8	751	39.6	3,802	19.0	318	13.6	356	45.3
TQ*	3,153	----	256	---	1,128	----	87	----	107	----
1977	14,508	----	1,076	---	4,725	----	352	----	476	----
1978	16,813	15.9	1,299	20.7	5,595	18.4	352	0.0	555	16.6
1979	19,299	14.8	1,575	21.2	6,619	18.3	366	4.0	649	16.9
1980	23,290	20.7	1,890	20.0	8,049	21.6	401	9.6	782	20.5
1981	27,891	19.8	2,276	20.4	9,690	20.4	439	9.5	976	24.8
1982	32,769	17.5	2,703	18.8	11,578	19.5	477	8.7	1,293	32.5
1983	37,187	13.5	3,190	18.0	13,824	19.4	521	9.2	1,686	30.4
1984	40,589	9.1	3,645	14.3	15,384	11.3	551	5.8	2,025	20.1
1985	43,792	7.9	4,169	14.4	16,602	7.9	572	3.8	2,206	8.9
1986	45,873	4.8	4,990	19.7	18,808	13.3	579	1.2	2,249	1.9
1987	47,484	3.5	5,953	19.3	21,457	14.1	614	6.0	2,227	-1.0
1988	50,164	5.6	6,784	14.0	24,018	11.9	832	35.5	2,376	6.7
1989	53,055	5.8	7,683	13.3	26,579	10.7	3,065	268.4	2,775	16.8

1/ Includes payments for routine maintenance dialysis treatments since FY 1974.

2/ Includes payments for inpatient radiology and pathology services, as well as durable medical equipment, ambulance, and several other non-physician services covered under Medicare Supplementary Medical Insurance.

3/ Includes payments under both Medicare Hospital Insurance and Supplementary Medical Insurance.

* Transitional quarter to adjust for change in start of Federal fiscal year from July 1 to October 1 in 1976.

Note: Payments on an incurred basis by type of provider are estimated and subject to change as more recent and complete data become available and estimates are revised.

Source: Health Care Financing Administration, Office of the Actuary.

Table 1-3

DISTRIBUTION OF ESTIMATED INCURRED MEDICARE BENEFIT PAYMENTS
BY TYPE OF PROVIDER
FY 1967-89

Fiscal Year	Inpatient Hospital	Outpatient Hospital	Physicians	Skilled Nursing	HHA	Other 1/
1967	68.1 %	0.6 %	26.2 %	3.7 %	0.8 %	0.5 %
1968	65.2	0.8	25.3	6.8	1.3	0.6
1969	65.2	1.2	25.1	6.5	1.5	0.6
1970	67.1	1.6	25.0	4.2	1.4	0.5
1971	69.4	1.9	24.2	2.8	1.1	0.5
1972	70.1	2.0	24.1	2.1	1.1	0.6
1973	70.1	2.1	23.8	2.2	1.2	0.6
1974	69.4	3.3	23.1	2.2	1.3	0.7
1975	69.5	3.8	22.3	2.0	1.7	0.8
1976	68.8	4.4	22.1	1.9	2.1	0.8
TQ*	66.1	5.4	23.6	1.8	2.2	0.9
1977	68.1	5.0	22.2	1.7	2.2	0.8
1978	67.8	5.2	22.6	1.4	2.2	0.8
1979	67.1	5.5	23.0	1.3	2.3	0.8
1980	67.0	5.4	23.2	1.2	2.3	0.9
1981	66.9	5.5	23.2	1.1	2.3	1.0
1982	66.4	5.5	23.5	1.0	2.6	1.0
1983	65.2	5.6	24.2	0.9	3.0	1.1
1984	64.4	5.8	24.4	0.9	3.2	1.3
1985	63.9	6.1	24.2	0.8	3.2	1.7
1986	61.8	6.7	25.3	0.8	3.0	2.3
1987	59.3	7.4	26.8	0.8	2.8	2.9
1988	57.5	7.8	27.5	1.0	2.7	3.5
1989	54.8	7.9	27.4	3.2	2.9	3.8

1/ Includes Independent Labs, GPPP and Hospice.

* Transitional quarter to adjust for change in start of Federal fiscal year from July 1 to October 1 in 1976.

Source: Health Care Financing Administration, Office of the Actuary.

Table 1.4

Day and Cost Outlier Thresholds: FY 1984 - FY 1992

Fiscal Year	Day Outlier Thresholds	Cost Outlier Thresholds
	Lesser of the Geometric Mean Length-of-Stay Plus:	Greater Of:
FY 1984	20 Days or 1.94 Standard Deviations from the Mean	1.5 x Federal DRG Rate or $12,000
FY 1985	22 Days or 1.94 Standard Deviations from the Mean	2.0 x Federal DRG Rate or $13,000
FY 1986	17 Days or 1.94 Standard Deviations from the Mean	2.0 x Federal DRG Rate or $13,500
FY 1987	17 Days or 1.94 Standard Deviations from the Mean	2.0 x Federal DRG Rate or $13,500
FY 1988	18 Days or 2.0 Standard Deviations from the Mean	2.0 x Federal DRG Rate or $14,000
FY 1989	24 Days or 3.0 Standard Deviations from the Mean	2.0 x Federal DRG Rate or $28,000
FY 1990	28 Days or 3.0 Standard Deviations from the Mean	2.0 x Federal DRG Rate or $34,000
FY 1991	29 Days or 3.0 Standard Deviations from the Mean	2.0 x Federal DRG Rate or $35,000
FY 1992	32 Days or 3.0 Standard Deviations from the Mean	2.0 x Federal DRG Rate or $44,000

Source: HCFA Bureau of Policy Development

Chapter 2

Impact on Medicare Beneficiaries

Among the major objectives of the Medicare program under PPS is the assurance of continued access to appropriate health care by Medicare beneficiaries and the maintenance of the quality of care provided to these beneficiaries. This is of particular concern under a payment system such as PPS where the financial incentives to hospitals may encourage a more parsimonious use of services during a hospital stay. Lower levels of utilization need not, however, translate into concerns about access and quality. Indeed, the incentives under PPS may serve to encourage improvements in access and quality. For instance, improved hospital management, increased specialization of services, and elimination of unnecessary services may result in the increased effectiveness of care.

This chapter presents basic trend data on the utilization of short-stay hospital care by the Medicare population and summarizes an analytical study of PPS impact on mortality. The analyses include data through calendar year (CY) 1989.

Beneficiary Access and Utilization

This section provides basic descriptive data on hospitalization rates for the elderly, the disabled, and the end stage renal disease (ESRD) Medicare populations. The variables of interest include the discharge rate (number of discharges per 1,000 enrolled persons), average LOS, and the days of care rate (number of days of care per 1,000 enrolled persons). In addition, data are presented on a DRG specific basis for the aged. Details of the methods used in this section can be found in the 1986 PPS Impact Report (U.S. Department of Health and Human Services, 1987).

Medicare's Aged Population

Previous years' analyses focused on trend comparisons between States operating under PPS and States operating under waivers of PPS (New York, Massachusetts, Maryland, and New Jersey). Although these States by no means represented a true control group, their systems were sufficiently different to warrant their use for general comparisons. In 1986, both New York and Massachusetts entered the national PPS system. It was decided, therefore, to discontinue the PPS/non-PPS comparisons and examine national trends for the Medicare program as a whole.

Table 2.1 shows Medicare utilization for persons 65 years of age and over for the years 1980 through 1989. From 1980 through 1983, the discharge rate in the U.S. increased from 376 per 1,000 beneficiaries to 400 per 1,000, an average annual increase of 2.1 percent. This was a continuation of the trend that had

been observed since 1968. In 1984, the discharge rate declined (by 3 percent) for the first time since the beginning of Medicare. Larger declines of 8.1 percent and 5.4 percent occurred in 1985 and 1986, respectively. From 1986 through 1989 the discharge rate remained essentially unchanged, declining only from 337 per 1,000 in 1986 to 330 per 1,000 in 1989. The net decline in the discharge rate between 1983 and 1989 was 17.4 percent. However, 90 percent of this decline occurred within the first 3 years after PPS implementation.

There are at least two reasons for these declines. Peer Review Organizations (PROs) are actively engaged in admission screening. Hospital administrators and physicians often mention the sentinel effect of PROs in reducing inappropriate admissions. In addition, there is the effect of the increasing frequency of ambulatory surgery, particularly lens extractions. From 1983 to 1985, the number of Medicare admissions fell by 880,000. During the same time, lens extractions in the inpatient hospital setting fell by 300,000, accounting for over one-third of the total decline in admissions. However, much of the switch to ambulatory surgery had occurred by 1986, thus reducing the opportunity for further declines.

There was a very large decline in LOS during the first year of PPS. In contrast to the trend in discharge rates, average LOS had been steadily declining prior to the start of PPS--in fact, since the beginning of the Medicare program. From 1980 through 1983, average LOS declined from 10.3 days to 9.6 days, an average annual decline of 2.3 percent. In 1984, the decline was 0.9 days, or 8.8 percent. LOS continued to decline in 1985, but at a greatly diminished rate, falling from 8.7 days to 8.4 days, a decrease of 3.9 percent. However, since 1985 there has been little change in LOS, in fact there has been a slight increase to 8.5 days in 1989. Since the beginning of PPS, the total decline in LOS has been 11.5 percent, all of which occurred in 1984 and 1985.

The product of the discharge rate and the average LOS is the total days of care rate. This rate had not changed much for the Medicare aged population during the 15 years before the beginning of PPS, because the rate at which discharges had been rising was offset by an almost equal rate of decline in the average LOS. In 1984, however, the combination of a large decline in LOS and the first-ever decline in discharges resulted in an 11.5 percent decline in the days of care rate (from 3,831 days per 1,000 beneficiaries in 1983 to 3,390 per 1,000 in 1984). The decrease in the days of care rate was similar in 1985 (11.7 percent). In 1986 the decline was 5.4 percent, due entirely to the decrease in the discharge rate. In the 3 years 1986 to 1988 the days of care rate declined by only 1.5 percent (from 2,842 per 1,000 to 2,799 per 1,000), reflecting the stability shown in both the discharge rate and average LOS. Since the beginning of PPS there has been a 27 percent decline in the days of care per 1,000 beneficiaries. However, 96 percent of that decline occurred during the first 3 years (through 1986).

A major concern has been whether any changes in utilization rates fell disproportionately on high risk age, sex, and race groups with potential access problems. As shown in Table 2.1, however, declines in discharge rates since the introduction of PPS have been greater for younger persons than for older persons and greater for white beneficiaries than for persons of other races. Females have had a slightly larger decrease in the discharge rate (17.9 percent) than have males (16.9 percent) even though they had a lower discharge rate in 1983. The reason for this is not clear. Because men and women have different patterns of admission, changes in overall discharge rates could affect them differentially. For instance, hospitalization for lens extraction was more common for females (19.5 per 1,000) than for males (14.3 per 1,000) in 1983. Thus, the movement of this procedure to outpatient settings had a larger impact on the total discharge rate for females than for males. Whether or not a change in the total discharge rate represents an access issue would depend on analyses of diagnosis specific discharge rates.

LOS is directly related to the age of the patient. Changes in LOS have been fairly consistent, with all age groups over age 70 experiencing net decreases of between 11.0 and 11.9 percent. A slightly larger decline of 14.3 percent was experienced by persons ages 65 to 69. Declines in LOS were slightly higher for males than for females and for whites than for other races.

Declines in days of care per 1,000 beneficiaries were greatest for persons ages 65 to 69 (33.7 percent) and the least decline was experienced by persons ages 85 and over (20.7 percent). Declines were very similar for males and females and whites had a greater decline (27.9 percent) than did persons of other races (20 percent).

In summary, the data indicate that there has been little change in <u>relative</u> utilization levels across age, sex, or race categories. If the reductions in the discharge rate and LOS represent decreased access, these decreases have been relatively evenly distributed across demographic categories. Similarly, to the extent that these reductions represent decreases in overuse, they have been equitable, at least in a statistical sense. Such changes as have occurred have not been disproportionate for the higher risk groups (the oldest and the non-whites). To the contrary, utilization rates have changed the least for these groups. In addition, it appears that the volume of hospital care has stabilized, as shown by the very slight 1.5 percent decrease in the days of care rate between 1986 and 1989.

<u>DRG-Specific Utilization Rates</u>

As described in the 1986 PPS Impact Report, changes in DRG-specific utilization rates in the first year of PPS were quite large and generally believed to reflect, to a great extent, changes in coding practices. Consequently, in subsequent reports only the changes that have taken place since 1984 are examined for DRG-specific discharge rates and average LOS.

Discharge rates per 1,000 beneficiaries are shown in Table 2.2 for the 20 DRG combinations that had the highest rates nationwide in 1984. These groups account for almost one-half of all Medicare admissions among the elderly. Nine of these groups decreased in frequency from 1984 to 1989. The greatest declines were shown by atherosclerosis (85.1 percent), DRG 468--unrelated operating room procedure (57.3 percent), chronic obstructive pulmonary disease (56.8 percent), back problems (45.4 percent), and diabetes (42.4 percent). There were six DRG combinations which have had an increase of at least 10 percent in the discharge rate per 1,000. These include major joint procedures (42.6 percent), nutritional and miscellaneous metabolic disorders (34 percent), pneumonia (15.6 percent), bronchitis (13 percent), kidney infections (12.3 percent), and angina (10.2 percent).

Changes in LOS are shown in Table 2.3 for the 20 DRG combinations with the longest LOS in 1984. Five of these DRGs had cumulative decreases of greater than 20 percent through 1989; vascular procedures except major reconstruction (43.3 percent decrease), major joint procedures (27.4 percent), fracture of the hip/pelvis (24.1 percent), hip/femur procedures (22.4 percent), and acute myocardial infarction (20.9 percent). Six of these DRGs have experienced increases since 1984-- psychoses, stomach, esophageal, and duodenal procedures, degenerative nervous system disorders, lymphoma or leukemia, organic disturbances and mental retardation, and unrelated operating room procedures.

Medicare's Disabled Population

Table 2.4 shows utilization for disabled Medicare beneficiaries from 1980 through 1989. The hospital utilization trends for the disabled are similar to those for the aged. Discharge rates increased steadily up through 1983. From 1983 through 1989 there was a 17.3 percent decline in the discharge rate, with over one-half of the decrease occurring during 1984 and 1985. Average LOS for the disabled population declined in 1984 (8.2 percent) and in 1985 (3 percent). Between 1985 and 1989 LOS remained essentially unchanged. The total decrease in LOS since the beginning of PPS is 10.8 percent. These trends are very similar to the declines in discharge rates and LOS for the aged. Total days of care per 1,000 dropped by 26.2 percent for the disabled compared to the 27 percent decrease for the aged.

As with the aged, all population subgroups experienced decreases in utilization rates. Persons ages 44 and under had a decrease in days of care of 12.7 percent, less than one-half the decrease for older disabled persons. Females had a greater decline in days of care (29.2 percent) than did males (24 percent) and whites had a greater decline in days of care (28.4 percent) than did persons of other races (18.2 percent).

Medicare's ESRD Population

Table 2.5 shows hospital utilization for the Medicare ESRD population on dialysis.[1] Unlike the aged and disabled populations, discharge rates for the ESRD population have remained relatively unchanged since the advent of PPS, averaging about 1,600 discharges per 1,000 persons for each of the years 1984 through 1989. There was no consistent age effect on discharge trends. Rates decreased by 17.6 percent for persons under age 15 (from 2,136 per 1,000 in 1984 to 1,760 per 1,000 in 1989). There were also modest decreases for persons ages 15 to 24 and for all persons over age 55. LOS declined slightly in 1985 and 1986 but increased in each of the years 1987 through 1989. The net result is that LOS for ESRD persons on dialysis was slightly higher in 1989 than in 1984. The increased LOS, combined with the stable discharge rates, have resulted in a moderate 3 percent increase in days of care per 1,000 ESRD beneficiaries (from 15,295 in 1984 to 15,751 in 1989). Therefore, unlike the aged and disabled populations, where the number of hospital days per 1,000 persons has decreased by nearly 30 percent, days of care rates among the ESRD population are relatively unchanged.

Mortality

The mortality analysis included in this year's report is based on 30 day post-admission mortality and is an extension of last year's severity adjusted mortality analysis.

There are inherent problems in analyzing hospital-related mortality. Foremost among these is the problem of variations in case mix. Hospitalized patients, by definition, represent a highly selective group of persons. The decision to hospitalize a patient is based on a variety of factors, including individual physician practice patterns, practice patterns within the specific geographical area, patient preference, and payment incentives. All of these factors, in addition to the basic condition of the patient, influence the hospitalization decision.

As described in the discussion of access and utilization above, there has been an unprecedented decrease in Medicare discharge rates (except for ESRD patients) since the advent of PPS. To the extent that these decreases occurred among categories of patients who are less severely ill, and thus at low risk of dying, the resulting pool of hospitalized patients is, on average, more severely ill, and consequently at greater risk of death. Therefore, it is important that any analysis of trends in hospital-related mortality address the issue of changing case mix.

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[1] Due to a change in the computation of hospitalization rates for the ESRD population, this year's analysis had to be limited to the years 1984 and later. Previous analyses showed little change in hospitalization rates for persons with ESRD in the years prior to the implementation of PPS.

The decline in admissions may have resulted in intra-diagnostic, as well as inter-diagnostic, changes in severity. This hypothesis was tested in a study using the computerized disease staging methodology developed by Systemetrics/McGraw Hill (Gonnella, 1986). Disease staging was used because it was developed for the purpose of measuring severity of disease in terms of likelihood of death or residual impairment, and it can be generated from the MedPAR data set without additional medical record abstraction. The specifics of this analysis were described in the 1986 PPS Impact Report using 1985 data. The analysis below is an extension of that analysis to 1988 data.

The primary objective of this analysis is to determine whether there has been a change in 30 day post-admission mortality from 1984 to 1988 among Medicare patients, after adjusting for changes in case mix severity. A total of 819 risk-homogenous groups have been developed, which account for mortality risk differential based on disease, stage of disease, presence of high risk comorbidity, age, and sex. These groups are roughly analogous to the DRG groupings based on payment. That is, just as the DRGs are representative of groups of patients for whom costs are relatively similar, the 819 groupings in this analysis are groupings of patients for whom the probability of death within 30 days of admission is similar.

A comparison of CY 1988 Medicare hospital mortality rates with expected mortality rates based on the severity adjustment procedure described above is presented in Table 2.6. The table shows total discharges, actual percent dead, expected percent dead (based on 1984 mortality rates), and the standardized mortality ratio (SMR) for each of the 31 high mortality diseases and the four groups of low mortality diseases. The SMR is the ratio of the actual mortality to the expected mortality. Ratios less than 1.0 represent cases in which the actual mortality is less than would have been expected, given the FY 1988 severity levels, and ratios greater than 1.0 represent cases in which the actual mortality is greater than would have been expected, given the FY 1988 severity levels.

Of the 35 disease groupings, there were 18 in which the SMR was less than 1.0 and 14 in which the SMR was greater than 1.0. The lowest SMR (0.64) was for other general conditions (an actual mortality rate of 2.9 percent versus an expected rate of 4.6 percent) and the highest SMR (1.30) was for the residual group of 350 diseases that had been grouped solely on the basis of 16 body systems (an actual mortality rate of 2.7 percent versus an expected rate of 2.1 percent).

Overall, the severity classification system accounted for essentially all of the increase in mortality between FY 1984 and FY 1988. The mortality rate for FY 1984 was 6.6 percent, so, all things being equal, the expected mortality rate for FY 1988 would also have been 6.6 percent, considerably below the observed FY 1988 rate of 7.6 percent. Controlling for disease category,

stage of illness, high risk comorbidity, age, and sex resulted in an expected mortality rate for FY 1988 of 7.7 percent, slightly higher than the observed rate of 7.6 percent.

There are two limitations to this analysis that must be considered. First, there is the possibility that much of the observed increase in stage of illness and comorbidities is due to coding or "DRG creep." A study by Carter and Ginsburg (1985) showed that there was an initial increase in case mix (as measured by the case mix index, or CMI), which was largely due to coding practice changes. The CMI continued to increase through FY 1988, but less of that change could be attributed to coding practices (Carter, Ginsburg, and Relles, 1990). Still, coding creep remains as a possible explanation for some of the observed increase in severity. This problem is not unique to this study but is relevant to any analysis of hospitalization data that uses case mix adjustment techniques based on diagnostic codes.

Second, the computerized staging method used in this analysis relies, of necessity, on the information available on the MedPAR files. As such, it permits a limited characterization of severity of illness. The principal diagnosis reflects the cause of the admission. The remaining secondary diagnoses (up to four) include conditions present at admission as well as conditions and complications encountered during the stay itself. It is not possible, using these data, to clearly differentiate between conditions present at admission and conditions arising as a result of the stay itself. Although an attempt was made to eliminate severity that could have been caused by the stay, when possible (particularly for unrelated comorbidities[2]), it is possible that some of the measured increase in severity could have been caused by the care provided rather than the condition of the patients on admission.

Post-Hospital Care

The decreased hospital LOS resulting from PPS is one reason why more Medicare beneficiaries are likely to need post-hospital care, such as the services delivered by SNFs, HHAs and swing-bed facilities. This section presents information concerning trends in SNF and home health care utilization and the availability of these Medicare-certified providers. Results are presented of descriptive and econometric studies which examine post-hospital care during the period of PPS implementation. Finally, there is information describing the Department's activities regarding quality of post-hospital care and the denial and reconsideration process for HHA and SNF claims. This section provides

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2 For example, complicating conditions such as infections and acute myocardial infarctions were not counted as comorbid conditions for this study because they may not have been pre-existing conditions. That is, they could be measures of complications of treatment rather than severity of illness at admission.

information only on services covered by Medicare, which do not include all types of post-hospital care that beneficiaries may use.

Trends in SNF Utilization and Availability

With the adoption of the MCCA of 1988 (effective January 1, 1989, through December 31, 1989), the Medicare SNF benefit changed in a number of ways. First, the 3-day qualifying prior hospitalization was eliminated. Second, coverage was extended from 100 days in a spell of illness to 150 days in a calendar year. Third, the number of possible coinsurance days was reduced from 80 to 8 days and moved from the end to the beginning of the period. Fourth, the SNF coinsurance was no longer linked to one-eighth of the inpatient hospital deductible ($67.50 in 1988) but to the national average per diem reasonable cost of SNF care ($25.50 in 1989). These provisions were all repealed effective January 1, 1990.

These changes had a significant effect on the levels of Medicare SNF utilization between 1988 and 1989. During this time period, Medicare SNF admissions increased by 78 percent, the total number of covered days increased by 134 percent, and the average days per admission increased by 32 percent (see Table 2-7). With the repeal of the MCCA SNF provisions, the SNF benefit is governed by the previous rules in effect in 1988; for example, the SNF coinsurance for 1990 rose to $74 for the 21st to the 100th days. Although it was expected that SNF utilization patterns would be similar to patterns following clarification of the definition of "skilled" level of nursing care effective April 1988, preliminary data for 1990 do not show such a drastic decrease after the repeal of MCCA. Research is under way to attempt to disaggregate changes in utilization caused by a combination of the MCCA provisions and by the coverage guideline changes.

Consistent with the overall trends in utilization discussed above, the number of Medicare-certified SNFs increased from 5,760 in 1983 to 8,937 in 1990; and the number of swing bed hospitals increased from 149 in 1983 to 1,216 in 1990 (Table 2-8). The increase in the number of Medicare-certified facilities since the implementation of PPS suggests that Medicare beneficiaries probably have had less difficulty in recent years locating geographically accessible facilities where they could receive covered SNF care. This is particularly true in the rural areas, where swing bed hospital admissions represented almost 29 percent of all SNF admissions in 1987 (Dubay, 1991).

Trends in Medicare Home Health Utilization and Availability

Between 1988 and 1989, the largest increase in Medicare home health utilization occurred since the first 2 years after the introduction of PPS (Table 2-9). The number of persons served increased to more than 1.7 million (almost 8 percent), total home health visits increased to 47 million (25 percent) and the average number of visits per person served rose to 27 (12 percent).

Much of this increase may be attributed to clarification of Medicare home health coverage criteria as part of the agreement between HCFA and the Plaintiffs in Duggan v. Bowen. The HHA manual revisions include the following:

> physicians' orders for care will be accepted unless objective clinical evidence contradicts their orders;
>
> the fiscal intermediaries cannot deny coverage based solely on utilization review screens;
>
> coverage cannot be denied based solely on patients' having chronic diseases or requiring long term care (LTC);
>
> patients can qualify for skilled nursing observation when there is reasonable potential for complications or a need for change in treatment;
>
> nurses are allowed to manage certain complex unskilled care cases under a new skilled service category;
>
> patients can qualify for home therapy if they show the potential for material improvement in their functional ability; and
>
> patients can make out-of-pocket payments for supplemental home services without jeopardizing their Medicare home care coverage.

These coverage clarifications may result in the Medicare home health program moving away from its strict emphasis on acute care to care that was previously considered chronic. The definitions of part-time or intermittent home health aide and skilled nursing care became effective in November 1988 (with reconsideration of claim denials on those grounds retroactive to March 1987). The criteria concerning covered and noncovered home health services became effective in July 1989, so the full effect of all these changes will be seen in later years.

The number of Medicare approved HHAs has grown from 4,235 in 1983 to 5,730 in 1990, a 35 percent increase (Table 2-8). The number of HHAs peaked at 5,932 in 1985, fairly soon after implementation of PPS and then declined somewhat, although there has been some increase again between 1989 and 1990.

Studies of Post-Hospital Care

Georgetown University conducted a study that examined beneficiary post-hospital service utilization as a function of hospital characteristics. Hospital admissions for a sample of 1,212 hospitals in 21 States were selected for two time periods, 1982 and 1985 (January to June for each). Beneficiary claims for hospital, SNF and home health use for a 6 month period were linked. The study developed an index of the amount of fiscal pressure PPS imposed on a hospital. The analyses, however,

generally did not show a relationship between fiscal pressure and post-hospital home health and skilled nursing home use. Although SNF admissions per hospital admission grew slightly faster in the most negatively impacted hospitals (15.1 percent versus 10.4 percent), the difference was not statistically significant.

They found that hospital ownership of a LTC facility was associated with higher rates of SNF admissions in 1985 (4.8 percent versus 3.3 percent). Hospitals which had added a LTC facility in 1982 or 1983 had the lowest rates of SNF admissions per hospital admission but had the highest rate of growth in SNF use by 1985. These hospitals may have added such facilities because of limited access to freestanding SNFs as evidenced by their low 1982 use. Patients from hospitals adding an LTC facility had the shortest SNF stays in 1985 (12.3 days versus 17.9 days in those who had one in 1982 and 23.5 days in those with none). Those hospitals adding an LTC facility may have used them more aggressively by transferring less sick patients. Hospitals which added a HHA tended to have the lowest HHA use in 1982 (8.4 percent of admissions versus 9.2 percent in hospitals with an existing HHA and 9.7 percent in hospitals with no HHA).

In addition, both Abt Associates, Inc. and the RAND Corporation are currently updating information on post-hospital use of home health, SNF and rehabilitation services through 1988.

Course and Outcomes of Post-Hospital Care

A study, which is being conducted by the University of Minnesota School of Public Health and the RAND Corporation with HCFA and Assistant Secretary for Planning and Evaluation (ASPE) funding, is examining the course and outcomes of post-hospital care (including rehabilitation hospital, SNF and home health care). It involves two major components: analysis of secondary data as well as collection and analysis of primary clinical data.

In the first component, the researchers analyzed national Medicare data from the year ending June 1985 (Neu et al., 1989) for five DRGs which account for about one-eighth of Medicare hospital discharges: stroke, chronic obstructive pulmonary disease, congestive heart failure, hip/joint procedures, and hip fractures. The results indicated that patient-specific factors appear to influence post-hospital care utilization strongly; these results are reported in more detail in the 1988 report in this series.

The second component of this study takes the same DRGs used in the national data analysis and conducts a detailed examination of clinical cases at three sites (Pittsburgh, Houston, and the Twin Cities). Three forms of post-hospital care are being studied: nursing home, home health, and rehabilitative care (whether in a rehabilitation hospital or a unit of an acute care hospital). Information is gathered from selected Medicare beneficiaries at four points in time: acute care hospital discharge, and at 6 weeks, 6 months, and 1 year following hospitalization.

Information is being collected on factors such as demographic characteristics, functional status, and severity of illness. In addition to information obtained from patients and their caregivers, patients' hospital records were abstracted using a modification of the Medisgroups approach. Approximately 2,700 discharges from 52 hospitals at the 3 sites have been interviewed and followed longitudinally, together with their informal caregivers. Preliminary results comparing the patterns of post-hospital care for the five DRGs are reported in the 1988 report in this series. A final report is due in mid-1992.

<u>Procedures for Assuring Quality of Post-Hospital Care</u>

Section 9305(i) of OBRA 1986 requires that each annual report include an evaluation of the adequacy of the procedures for assuring quality of post-hospital services furnished under title XVIII of the Social Security Act. HCFA ensures the quality of post-hospital care in a number of ways. First, it sets requirements of participation in the Medicare program focusing on quality and operates a survey and certification process for LTC facilities and HHAs to ensure that these requirements are met. Second, it establishes provisions specifying activities with respect to post-hospital care. Finally, HCFA is establishing discharge planning as a condition of participation for hospitals.

In the first area, HCFA implemented new requirements for nursing home facilities that are designed to improve the quality of care and quality of life in these institutions. The new LTC requirements became effective on October 1, 1990, and mandate 24-hour licensed nursing coverage, other staffing and nurses' aide training, and pre-admission screening and resident review for mentally retarded, developmentally disabled, and mentally ill individuals. At the same time, the new outcome oriented survey process mandated by OBRA 1987 was implemented. As of October 1990, the distinction between SNFs and intermediate care facilities under Medicaid ended; all facilities are considered nursing facilities, although Medicare providers will nominally be called SNFs. Both must meet the same LTC facility requirements.

Quality assurance procedures and efforts are also being strengthened and expanded in the home health area. As of August 1990, all home health aides used by Medicare certified agencies must have completed an approved training and competency evaluation program. In addition, agencies are required to provide patients written notice of their rights before treatment is initiated by the HHA. The survey process was also revised as an outcome-oriented approach (including visits to patients' homes as part of every survey) and was implemented in 1991. Standardized assessment tools and survey protocols have been developed to evaluate patient outcomes. Finally, each State must maintain a toll-free hotline to enable consumers to find local Medicare-approved home care agencies and to obtain an indication of their quality. For example, the hotlines provide information about: when the agencies were last inspected; whether any deficiencies in patient care were found; whether these

deficiencies were corrected; and whether any sanctions were imposed on the agencies. All States had hotlines in operation by the end of 1990.

In the second area, PROs are required to review at least a sample of cases readmitted to PPS hospitals within 31 days and the intervening post-hospital care period, including SNF, HHA, and some outpatient services. Generic quality screens have been used since April 1989 by the PROs to assess the quality of post-hospital care.

In the third area, hospitals would be required to have a discharge planning process as a distinct condition of participation for the Medicare and Medicaid programs. The elements of that discharge planning process will also be specified to improve the likelihood that a patient's post-hospital placement will be appropriate. A proposed rule that would implement this requirement was issued in June 1988 and awaits final action.

In addition, an Advisory Panel established by OBRA 1986--in conjunction with HCFA researchers--developed a uniform needs assessment instrument that potentially could be used by hospitals and other providers for evaluating an individual's need for post-hospital extended-care services, home health services, and LTC services. This instrument collects sociodemographic information, health status, functional status, environmental factors in post-discharge care, nursing and other care requirements, family and community support, patient/family goals and preferences and options for continuing care. A report to Congress with recommendations for the appropriate use of the instrument will be submitted during 1992.

Evaluating the Appropriateness of Post-Hospital Care

Section 9305(i) of OBRA 1986 requires that each annual report provide information concerning the assessment of problems that have prevented groups of beneficiaries from receiving appropriate post-hospital care. Several studies are exploring this issue including a pilot study of aftercare, post-hospitalization outcome studies and a study of post-acute care in three cities.

HCFA and ASPE completed a pilot study to develop methods for assessing the appropriateness of post-hospital care for patients discharged to the community. These methods involved classification of patients according to risk and the use of professionally developed guidelines for care and health status outcome assessments. Study methods also included approaches for measuring the nature and extent of problems encountered by patients in obtaining post-hospital care and other factors associated with less than adequate service patterns, including potential barriers to the receipt of needed services (e.g., financial barriers and provider availability), informal caregiver burdens, out-of pocket costs, discharge planning, and patient satisfaction.

All types of community-based, post-hospital care were included in the study, covering both skilled and unskilled care. Study methods involved classifying patients at the time of hospital discharge according to their post-discharge service needs and applying professionally developed guidelines to project aftercare needs. Projected need and patient outcomes were then compared with services received based on interview data. The study demonstrated the feasibility of the study methods including a high degree of hospital cooperation and good interview completion rates. The instruments used were able to detect statistically significant differences in outcomes for those patients whose aftercare met the guidelines compared to those patient's whose aftercare services did not. However, the pilot study demonstrated that missing data would be a persistent problem should expansion to full implementation be considered.

The Post-Hospitalization Outcomes Studies (PHOS) is a project sponsored jointly by HCFA and the Agency for Health Care Policy and Research (AHCPR) to assess the status of elderly Medicare beneficiaries following hospitalization for a specific condition or procedure. The goals of these studies are to identify the types and rates of both positive outcomes and complications following hospitalization and to develop indicators of patients who are at high risk for complications following hospitalization. This information may be used to determine the appropriateness of the hospital intervention and resulting post-hospital care. For example, the conditions selected for PHOS, elective total hip replacement and cholecystectomy, are surgical procedures that have undergone substantial technical advances in recent years. As a result of these advances, the criteria for patients who may be selected for these procedures have changed and the number of procedures has increased. PHOS will provide information about the appropriateness of these procedures by assessing the effectiveness of the intervention in improving the status of patients' post-hospitalization. Results of this study are expected in 1994.

The National Post-Acute Care study funded by HCFA and ASPE since 1986 is designed to determine what factors are associated with receipt of different types of post-acute care and what variations in patient outcomes may be associated with different sources of post-acute care as adjusted for case mix differences. The study traces the course of patients discharged from hospitals to nursing homes, rehabilitation facilities and community settings in three cities. A comprehensive set of information was collected on a series of 2,600 consecutive Medicare discharges for five DRGs from 52 hospitals. Interviews were conducted prior to discharge, and at intervals of 6 weeks, 6 months and 1 year after discharge from hospital. Results of the study are expected to provide information on the effectiveness of discharge planning. A final report is expected in July 1992.

Reconsiderations and Appeals for Payment of Post-Hospital Service

Section 9305(i) of OBRA 1986 requires that information on Medicare reconsiderations and appeals with respect to payment for

post-hospital services be included in each annual PPS report. Medicare beneficiaries have a right to have decisions regarding payment of their denied Medicare Part A claims reconsidered by intermediaries. If dissatisfied with the reconsideration decision, beneficiaries have the option of filing for an informal hearing conducted by an Administrative Law Judge (ALJ). The procedures governing this appeal process were described in the 1987 report of this series. OBRA 1987 expanded these rules to require that when a fiscal intermediary denies a provider's claim for home health, extended care, or post-hospital extended care services, it must furnish the provider and the beneficiary with a written explanation of the denial and its statutory or regulatory bases, and promptly notify these parties of the disposition of a reconsideration.

In FY 1990 approximately 11.8 percent of SNF claims were denied, compared to 10.5 percent in FY 1989. In FY 1990 there were 13,500 reconsideration requests which comprised 6.2 percent of denied SNF claims and 0.8 percent of all SNF claims. Including submissions from the previous year 12,954 requests were processed, of which 4,224 were reversed in whole or in part. There were 1,443 ALJ cases completed, of which 807 were reversed.

There has been particular Congressional concern about HHA denials. During FY 1990, approximately 2.1 percent of HHA claims were denied, compared to 3 percent in FY 1989. Because claims may contain a number of visits, for which only one or a few may be denied, HHA visit denials may be a more appropriate indicator than claims denial. In FY 1990, there were 1.7 percent of HHA visits denied compared to 2.6 percent in FY 1989. In FY 1990, there were 14,405 home health care cases submitted for reconsideration, comprising approximately 9.3 percent of all HHA denials and 0.2 percent of all HHA claims. Including submissions from the previous year, a total of 13,999 cases were processed, of which 6,910 were reversed. In FY 1990, 5,481 hearings were heard with 3,623 reversed partially or fully.

As a percentage of bills, HHA denials have declined substantially since 1986 and 1987, when denials were highest. Section 427 of the MCCA of 1988 had established an Advisory Committee on Medical Home Health Care to investigate the reasons for the increase in the denial of claims for home health in 1986 and 1987 and the need to reform the process involved in the denials. A report to Congress and HCFA from the Advisory Committee on Medicare Home Health Care was submitted in July 1989. The report stated that the major source of the problem was the inconsistency of interpretions of the Medicare benefit by fiscal intermediaries and HCFA. This in turn, was due to the way the benefit was defined in the legislation which left its interpretation open. This problem has been addressed by the clarification of Medicare home health coverage criteria, described above, and it has resulted in a decline in HHA denials.

The data in Table 2-7, however, do not indicate what the trend in post-hospital home health has been since the introduction of PPS because Medicare home health coverage is not contingent on a prior hospital stay.

Table 2.1

Discharges per 1,000, average length of stay, days of care per 1,000 beneficiaries and percent change for aged Medicare beneficiaries, U.S. Total by Age, Sex, and Race: 1980 through 1989

Age, sex and race	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Average Annual percent change 1980-83	Average Annual percent change 1983-89	Total Percent Change 1983-89
Discharges per 1,000													
Total	376	380	388	400	388	356	337	332	334	330	2.1%	-3.1%	-17.4%
Age													
65-69	291	294	293	299	285	257	241	237	236	231	1.0	-4.2	-22.7
70-74	349	352	359	370	358	328	310	304	302	298	2.0	-3.5	-19.4
75-79	420	424	435	449	436	400	376	371	374	369	2.3	-3.2	-17.8
80-84	481	490	505	520	507	471	446	440	442	439	2.7	-2.8	-15.6
85+	526	528	547	564	556	523	502	496	507	504	2.4	-1.8	-10.6
Sex													
Male	407	411	415	427	413	385	367	361	360	355	1.6	-3.0	-16.9
Female	355	360	371	382	371	337	318	313	316	313	2.5	-3.2	-17.9
Race													
White	382	386	393	405	392	359	341	334	335	331	2.0	-3.3	-18.2
Other	331	336	351	362	353	335	309	320	323	323	3.1	-1.9	-11.0
Average Length of Stay													
Total	10.3	10.1	9.9	9.6	8.7	8.4	8.4	8.6	8.5	8.5	-2.3	-2.0	-11.5
Age													
65-69	9.4	9.2	9.1	8.8	8.1	7.7	7.7	7.7	7.6	7.5	-2.2	-2.5	-14.3
70-74	9.9	9.7	9.6	9.3	8.5	8.2	8.2	8.4	8.2	8.2	-2.2	-2.1	-11.9
75-79	10.5	10.2	10.1	9.7	8.9	8.6	8.6	8.8	8.8	8.7	-2.4	-1.9	-11.0
80-84	11.0	10.8	10.6	10.2	9.2	8.8	8.9	9.2	9.1	9.0	-2.6	-2.0	-11.2
85+	11.4	11.2	11.0	10.6	9.6	9.0	9.1	9.4	9.4	9.4	-2.5	-2.0	-11.3
Sex													
Male	9.9	9.7	9.6	9.3	8.6	8.2	8.2	8.3	8.2	8.2	-2.0	-2.2	-12.5
Female	10.5	10.3	10.1	9.8	8.9	8.6	8.6	8.9	8.8	8.7	-2.5	-1.9	-10.8
Race													
White	10.1	9.9	9.8	9.5	8.6	8.3	8.3	8.5	8.4	8.3	-2.3	-2.1	-11.9
Other	11.3	11.1	11.0	10.6	9.6	9.2	9.3	9.6	9.5	9.5	-2.1	-1.8	-10.2
Total Days of Care per 1,000													
Total	3,858	3,824	3,851	3,831	3,390	2,993	2,842	2,867	2,849	2,799	-0.2	-5.1	-27.0
Age													
65-69	2,730	2,701	2,655	2,630	2,296	1,983	1,850	1,830	1,787	1,743	-1.2	-6.6	-33.7
70-74	3,456	3,416	3,437	3,425	3,026	2,689	2,549	2,546	2,491	2,433	-0.3	-5.5	-29.0
75-79	4,391	4,341	4,388	4,375	3,870	3,420	3,245	3,286	3,271	3,202	-0.1	-5.1	-26.8
80-84	5,282	5,288	5,333	5,286	4,669	4,161	3,963	4,035	4,025	3,960	0.0	-4.7	-25.1
85+	6,011	5,911	6,018	5,973	5,342	4,727	4,561	4,680	4,768	4,739	-0.2	-3.8	-20.7
Sex													
Male	4,040	4,000	3,986	3,984	3,532	3,150	3,004	2,997	2,960	2,899	-0.4	-5.2	-27.2
Female	3,736	3,705	3,761	3,729	3,294	2,888	2,738	2,780	2,774	2,731	0.0	-5.1	-26.8
Race													
White	3,873	3,835	3,850	3,829	3,389	2,980	2,838	2,838	2,819	2,759	-0.4	-5.3	-27.9
Other	3,748	3,738	3,860	3,849	3,392	3,091	2,876	3,076	3,068	3,078	0.9	-3.7	-20.0

Source: MedPAR/Patbill Files and Medicare Enrollment Counts, 1980 through 1989

Table 2.2

Discharges per 1,000 aged Medicare beneficiaries and percent change for the 20 most common DRGs in 1984: 1984 to 1989

Diagnosis Related Group	Title	Discharges per 1,000 1984	1985	1986	1987	1988	1989	Average Annual Percent Change 1984-89	Total Percent Change 1984-89
127	Heart Failure and Shock	18.2	18.5	17.8	17.9	18.1	18.4	0.2%	1.1%
182-184	Eso/Gastro/Misc Dig	16.5	13.2	11.6	10.9	10.9	10.8	-8.2	-34.8
089-091	Pneumonia	12.0	13.4	13.5	12.7	13.7	13.9	2.9	15.6
121-123	AMI	11.8	12.0	11.6	11.5	11.3	10.9	-1.7	-8.1
014	Spec Cerebro. Dis	11.6	11.9	11.6	11.7	11.6	11.5	0.0	-0.1
140	Angina	10.5	11.8	12.0	12.2	11.9	11.5	2.0	10.2
138-139	Card Arrhythmia	8.8	8.6	8.5	8.6	8.8	8.7	-0.2	-0.8
088	Chr Obstr Pul Dis	7.5	5.9	5.4	3.7	2.9	3.3	-15.4	-56.8
096-098	Bronchitis	7.1	7.1	7.4	7.7	8.3	8.0	2.5	13.0
243	Back Problems	7.0	5.9	5.1	4.5	4.1	3.8	-11.4	-45.4
336-337	Prostatectomy *	16.8	17.4	17.6	19.3	18.3	17.4	0.7	3.6
015	Tr Ischemic Att	6.5	6.5	6.0	5.5	5.2	4.8	-6.0	-26.4
296-298	Nutri/Mis Metabol Dis	6.1	7.8	8.0	7.9	8.2	8.2	6.0	34.0
174-175	G.I.Hemorr	5.5	6.0	5.8	5.7	5.7	5.7	0.6	3.3
468	Unrelated OR Proc	5.5	5.0	4.8	4.4	3.7	2.4	-15.6	-57.3
209	Maj Joint Procs	5.4	6.0	6.4	6.9	7.3	7.7	7.3	42.6
320-322	Kid Infect	5.4	5.3	5.8	6.1	6.1	6.1	2.3	12.3
132-133	Atherosclerosis	5.1	2.1	1.4	0.9	0.8	0.8	-31.6	-85.1
294-295	Diabetes	4.9	4.0	3.6	3.2	3.0	2.8	-10.4	-42.4
210-212	Hip and Femur Procs	4.8	4.8	4.8	4.9	4.9	5.0	0.5	2.5
	Sub-Total	167.2	162.7	157.9	154.8	154.0	151.3	-2.0	-9.5

Source: MedPAR/Patbill Files and Medicare Enrollment Counts, 1980 to 1987

* = Rates for prostatectomy are based on male enrollment only.

Does not include lens extractions (DRG 039). Although a significant inpatient procedure in 1984, by 1989 it was rarely performed on an inpatient basis

Table 2.3

Average Length of Stay for aged Medicare beneficiaries and
percent change for the 20 DRGs
with the longest stays in 1984: 1984 to 1989

Diagnosis Related Group	Title	Average Length of Stay 1984	1985	1986	1987	1988	1989	Average Annual Percent Change 1984-89	Total change 1984-89
148-149	Maj Bowel Procs	17.3	16.1	15.9	16.0	15.7	15.6	-2.0%	-9.7%
210-212	Hip/Fem Procs	16.8	15.0	14.4	14.1	13.5	13.1	-5.0	-22.4
468	Unrelated OR Proc	16.6	14.9	14.8	16.0	16.4	19.0	2.8	14.7
209	Maj Joint Procs	16.0	14.3	13.6	13.0	12.2	11.6	-6.2	-27.4
110-111	Maj Recon Vasc Procs	15.7	14.8	14.7	14.8	14.3	14.1	-2.1	-10.0
430	Psychoses	15.3	15.9	16.1	16.9	17.1	16.7	1.8	9.3
154-156	Sto/Eso/Duo Procs	14.4	15.9	15.7	15.7	15.9	16.2	2.4	12.8
195-198	Cholecystectomy	12.6	11.6	11.2	11.0	11.2	10.2	-4.1	-18.8
236	Fract Hip/Pelvis	12.2	11.1	10.0	9.8	9.5	9.3	-5.4	-24.1
112	Vasc Procs Exc Maj Re	12.2	11.7	10.1	8.2	7.2	6.9	-10.7	-43.3
014	Spec Cerebro. Dis	12.1	10.9	10.6	10.6	10.5	10.3	-3.1	-14.7
416-417	Septicemia	11.4	10.6	10.5	10.6	10.3	10.5	-1.7	-8.1
012	Degen Nervous Sys Dis	11.0	12.6	12.1	12.5	12.2	12.4	2.4	12.5
316	Renal Failu	10.5	9.7	9.5	9.8	9.6	9.6	-1.8	-8.9
403-405	Lymph - Leukemia	10.2	10.6	10.9	10.6	10.7	10.6	0.8	4.2
429	Org Dis & M.R.	10.2	10.4	10.8	11.7	11.9	12.7	4.6	25.2
087	Pul Edema/ Resp Fail	10.1	9.5	9.3	8.9	8.5	8.2	-4.0	-18.5
121-123	AMI	10.1	9.3	8.9	8.6	8.2	7.9	-4.6	-20.9
203	Malig - Hep, Pan	9.9	9.4	9.1	9.4	9.5	9.4	-0.9	-4.5
172-173	Digestive Malignancy	9.9	9.6	9.3	9.4	9.7	9.5	-0.7	-3.7
	Sub-Total	13.0	12.1	11.9	11.9	11.6	11.3	-2.6	-12.4

Source: MedPAR/Patbill Files, 1980 to 1989

Table 2.4

Discharges per 1,000, average length of stay,
days of care per 1,000 beneficiaries and percent change for disabled Medicare beneficiaries, U.S. Total by Age, Sex, and Race: 1980 through 1989

Age, sex and race	Calendar year 1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Average Annual Percent Change 1980-83	Average Annual Percent Change 1983-89	Total Percent Change 1983-89
Discharges per 1,000													
Total	396	397	406	413	383	369	363	348	341	342	1.5%	-3.1%	-17.3%
Age													
0-44 years	292	292	305	309	263	274	273	275	270	279	1.9%	-1.7%	-9.7%
45-54 year	396	404	410	424	391	372	361	339	330	329	2.4%	-4.1%	-22.4%
55-64 year	440	445	454	461	446	422	423	404	399	399	1.6%	-2.4%	-13.5%
Sex													
Male	368	372	378	386	356	347	342	330	322	325	1.7%	-2.8%	-15.9%
Female	443	441	453	460	431	406	399	380	372	371	1.3%	-3.5%	-19.3%
Race													
White	408	409	417	424	393	377	371	353	343	344	1.3%	-3.4%	-18.9%
Other	338	344	357	367	341	334	333	331	332	335	2.8%	-1.5%	-8.6%
Average length of stay													
Total	9.6	9.5	9.5	9.3	8.5	8.3	8.3	8.4	8.2	8.3	-1.0%	-1.9%	-10.8%
Age													
0-44 years	9.1	9.5	9.5	9.5	8.7	8.7	8.9	9.1	9.0	9.2	1.5%	-0.6%	-3.3%
45-54 year	9.2	9.1	9.2	9.0	8.3	8.0	8.1	8.0	7.8	7.9	-0.6%	-2.2%	-12.6%
55-64 year	9.8	9.7	9.5	9.3	8.6	8.2	8.2	8.2	7.9	7.9	-1.7%	-2.6%	-14.7%
Sex													
Male	9.3	9.2	9.2	9.0	8.3	8.1	8.2	8.2	8.0	8.1	-1.0%	-1.7%	-9.7%
Female	10.0	9.9	9.9	9.7	8.8	8.5	8.6	8.6	8.4	8.5	-1.1%	-2.2%	-12.2%
Race													
White	9.4	9.3	9.3	9.1	8.4	8.1	8.2	8.2	8.0	8.0	-1.0%	-2.1%	-11.7%
Other	10.6	10.4	10.5	10.2	9.3	8.9	9.0	9.1	8.9	9.1	-1.3%	-1.8%	-10.5%
Days of care per 1,000													
Total	3,788	3,774	3,838	3,836	3,264	3,044	3,030	2,916	2,791	2,831	0.4%	-4.9%	-26.2%
Age													
0-44 years	2,659	2,765	2,904	2,937	2,284	2,381	2,425	2,506	2,426	2,564	3.4%	-2.2%	-12.7%
45-54 year	3,634	3,666	3,759	3,824	3,229	2,965	2,908	2,719	2,570	2,591	1.7%	-6.3%	-32.2%
55-64 year	4,311	4,303	4,324	4,286	3,811	3,457	3,480	3,296	3,173	3,164	-0.2%	-4.9%	-26.2%
Sex													
Male	3,409	3,431	3,471	3,480	2,952	2,802	2,796	2,704	2,591	2,644	0.7%	-4.5%	-24.0%
Female	4,436	4,361	4,469	4,447	3,804	3,466	3,438	3,284	3,136	3,150	0.1%	-5.6%	-29.2%
Race													
White	3,834	3,817	3,861	3,861	3,290	3,062	3,040	2,891	2,745	2,765	0.2%	-5.4%	-28.4%
Other	3,577	3,582	3,741	3,731	3,155	2,972	2,988	3,010	2,956	3,053	1.4%	-3.3%	-18.2%

SOURCE: MEDPAR/PATBILL Files and Medicare Enrollment Counts, 1980 to 1989

Table 2-5

Discharges per 1,000, average length of stay,
days of care per 1,000 beneficiaries and percent change for Medicare
beneficiaries, U.S. Total by Age, Sex, and Race: 1980 through 1989
end stage renal disease beneficiaries on dialysis,
U.S. Total by Age, Sex, and Race: 1984 to 1989

	Calendar Year						Average Annual Percent Change	Total Percent Change
	1984	1985	1986	1987	1988	1989		
			Discharges per person					
Total	1,625	1,567	1,586	1,574	1,591	1,618	-0.1%	-0.4%
Age								
Under 15 years	2,136	1,768	1,813	1,769	1,736	1,760	-3.8%	-17.6%
15-24 years	1,609	1,486	1,524	1,555	1,584	1,555	-0.7%	-3.4%
25-34 years	1,477	1,441	1,507	1,500	1,539	1,572	1.3%	6.4%
35-44 years	1,470	1,401	1,435	1,425	1,438	1,501	0.4%	2.1%
45-54 years	1,436	1,467	1,466	1,421	1,473	1,497	0.8%	4.3%
55-64 years	1,623	1,537	1,561	1,547	1,543	1,584	-0.5%	-2.4%
65-74 years	1,691	1,623	1,627	1,614	1,631	1,649	-0.5%	-2.5%
75 years or over	1,852	1,760	1,757	1,748	1,736	1,744	-1.2%	-5.8%
Sex								
Male	1,544	1,495	1,513	1,496	1,523	1,551	0.1%	0.5%
Female	1,715	1,647	1,664	1,657	1,661	1,688	-0.3%	-1.6%
Race								
American Indian	1,836	1,801	1,842	1,837	1,848	1,926	1.0%	4.9%
Asian	1,325	1,327	1,180	1,210	1,128	1,106	-3.5%	-16.5%
Black	1,610	1,570	1,582	1,558	1,584	1,614	0.0%	0.2%
White	1,655	1,586	1,612	1,605	1,620	1,648	-0.1%	-0.4%
Other/Unknown	1,184	1,118	1,042	1,030	997	1,007	-3.2%	-15.0%
			Average Length of Stay					
Total	9.4	9.3	9.2	9.5	9.6	9.7	0.7%	3.4%
Age								
Under 15 years	8.0	7.5	8.1	7.5	7.4	7.2	-2.2%	-10.7%
15-24 years	6.7	7.2	7.1	7.3	7.4	7.1	1.2%	6.3%
25-34 years	7.6	7.7	7.3	7.4	7.9	8.0	1.2%	5.9%
35-44 years	8.0	7.9	7.8	8.3	8.2	8.3	0.9%	4.5%
45-54 years	8.3	8.1	8.3	8.4	8.7	8.8	1.4%	7.2%
55-64 years	9.2	8.7	8.8	9.0	9.2	9.2	0.1%	0.4%
65-74 years	10.3	10.0	10.0	10.1	10.2	10.3	0.0%	-0.1%
75 years or over	10.9	11.2	10.7	10.7	10.9	10.9	0.0%	0.1%
Sex								
Male	9.2	9.0	9.1	9.2	9.4	9.4	0.6%	2.9%
Female	9.7	9.6	9.4	9.7	9.9	10.0	0.7%	3.6%
Race								
American Indian	8.5	8.4	8.0	8.3	7.5	8.0	-1.3%	-6.2%
Asian	8.6	9.6	10.4	9.0	10.1	9.7	2.5%	13.1%
Black	9.3	9.1	9.0	9.2	9.5	9.6	0.6%	3.2%
White	9.5	9.4	9.4	9.6	9.8	9.9	0.7%	3.7%
Other/Unknown	8.7	8.4	8.6	9.4	9.8	8.8	0.2%	1.1%
			Days of Care per person					
Total	15,295	14,528	14,658	14,886	15,346	15,751	0.6%	3.0%
Age								
Under 15 years	17,142	13,290	14,665	13,342	12,809	12,604	-6.0%	-26.5%
15-24 years	10,704	10,699	10,745	11,299	11,651	11,005	0.6%	2.8%
25-34 years	11,205	11,051	10,947	11,129	12,116	12,642	2.4%	12.8%
35-44 years	11,689	11,102	11,142	11,819	11,734	12,472	1.3%	6.7%
45-54 years	11,849	11,866	12,183	11,950	12,883	13,239	2.2%	11.7%
55-64 years	14,887	13,386	13,724	13,967	14,267	14,606	-0.4%	-1.9%
65-74 years	17,491	16,161	16,223	16,315	16,707	17,032	-0.5%	-2.6%
75 years or over	20,250	19,692	18,853	18,761	18,869	19,092	-1.2%	-5.7%
Sex								
Male	14,155	13,404	13,730	13,741	14,252	14,642	0.7%	3.4%
Female	16,579	15,775	15,671	16,102	16,490	16,908	0.4%	2.0%
Race								
American Indian	15,677	15,143	14,667	15,197	13,887	15,438	-0.3%	-1.5%
Asian	11,401	12,749	12,256	10,918	11,380	10,773	-1.1%	-5.5%
Black	14,901	14,314	14,179	14,361	15,022	15,419	0.7%	3.5%
White	15,771	14,870	15,153	15,399	15,800	16,268	0.6%	3.2%
Other/Unknown	10,355	9,418	8,929	9,706	9,795	8,908	-3.0%	-14.0%

Source: HCFA, BDMS, ESRD Program Management and Medical Information System

Table 2-6

30 Day Post Admission Mortality Rates for Medicare
CY 1988, by Selected Disease Categories

Code	Disease Category	Total Discharges	Percent Dead		Standardized Mortality Ratio
			Actual	Expected	
215	Head Injury, including intracranial	32,536	10.9%	10.8%	1.01
242	Alcoholism	79,204	4.5	4.6	0.98
251	Cerebrovascular Disease	360,149	13.0	13.0	1.00
290	Other Nervous System Conditions	63,148	5.5	3.7	1.49
504	Bacterial Pneumonia	461,250	16.5	16.2	1.02
525	Bronchititis/Obstructive Pulmonary Disease	296,848	7.2	6.5	1.10
527	Cancer - Lung	126,711	27.0	25.6	1.06
590	Other Respiratory Conditions	265,828	9.6	8.5	1.12
620	Vascular Insufficiency of Intestine	18,388	27.4	32.7	0.84
624	Cancer - Colon and Rectum	105,921	10.5	13.5	0.78
690	Other Gastrointestinal Conditions	251,206	9.0	9.1	1.00
704	Cirrhosis of the Liver	23,586	20.6	20.7	1.00
710	Cancer - Pancreas	20,483	31.3	32.9	0.95
808	Tibia, Iliac, Femoral or Pop. Artery Dx	87,830	6.9	7.4	0.93
813	Aneurysm, Abdominal	37,642	16.9	17.9	0.94
815	Coronary Artery Disease (Acute MI)	1,132,280	8.8	11.1	0.79
821	Arrhythmias/Condition Disorders	492,715	6.6	7.1	0.93
822	Disease of Aortic Valve	47,053	8.0	9.1	0.88
829	Essential Hypertension	294,541	6.6	7.2	0.92
890	Other Cardiovascular Conditions	350,585	11.1	11.9	0.93
901	Urinary Tract INfections	201,418	10.1	8.4	1.20
902	Acute Renal Failure	55,089	20.8	22.6	0.92
903	Cancer - Genitourinary	54,790	4.7	5.5	0.86
1001	Carcinoma - Prostate	102,974	6.7	8.1	0.83
1214	Diabetes Mellitus	239,712	5.9	6.0	0.99
1290	Other Endocrin/Metabolic Conditions	234,711	13.2	11.6	1.13
1305	Acute Granulocytic Leukemia	7,137	34.8	30.4	1.14
1690	Other Bacterial Diseases	30,886	29.2	30.2	0.97
1691	Other Neoplasms	45,575	13.4	13.1	1.02
1693	Other General Conditions	282,369	2.9	4.6	0.64
1698	Carcinoma - Unstated Primary	60,657	30.0	26.6	1.12
Grp 1	5 Diseases: Stage/Comorb.	591,136	7.6	8.0	0.95
Grp 2	14 Diseases: Stage	926,500	5.1	4.6	1.12
Grp 3	31 Diseases	1,488,943	3.3	2.8	1.18
Grp 4	16 Body Systems	1,412,805	2.7	2.1	1.30
	All Discharges	10,282,606	7.6	7.7	0.99

Table 2-7
TRENDS IN MEDICARE SNF UTILIZATION: 1980 - 1989

				Covered Patient Days							
Year	SNF Admissions	Admissions per 1000 Enrollees	SNF/ Hospital Admissions Ratio	Number (millions)	Percent Change	Per 1000 Enrollees	Percent Change	Per Hospital Admission	Percent Change	Average Days per Admission	Percent Change
----											
1980	278,849	9.3	0.0267	8.7	n.a.	308.6	n.a.	0.83	n.a.	29.6	n.a.
1981	273,325	9.6	0.0252	8.6	-1.1%	300.0	-2.8%	0.79	-4.8%	29.2	-1.4%
1982	n.a.	n.a.	n.a.	8.7	1.2%	299.3	-0.2%	0.77	-2.5%	n.a.	n.a.
1983	308,929	10.4	0.0264	9.1	4.6%	307.3	2.7%	0.78	1.3%	29.2	n.a.
1984	332,746	11.1	0.0290	8.9	-2.2%	295.2	-3.9%	0.78	0.0%	26.6	-8.9%
1985	352,652	11.5	0.0330	8.3	-6.7%	270.0	-8.5%	0.77	-1.3%	23.4	-12.0%
1986	347,418	11.1	0.0340	7.7	-7.2%	273.0	1.1%	0.74	-3.9%	22.4	-4.3%
1987	327,012	10.3	0.0321	7.0	-9.1%	221.0	-19.0%	0.69	-6.8%	21.5	-4.0%
1988	445,513	14.0	0.0430	11.8	68.6%	364.0	64.7%	1.15	66.7%	26.5	23.3%
1989	791,490	24.0	n.a.	27.6	133.9%	837.0	129.9%	n.a.	n.a.	34.9	31.7%

Notes: Data through 1988 based on claims processed through December 31, 1989 and include PPS waiver States. 1989 data are preliminary.

Table 2-8
GROWTH IN NUMBER OF MEDICARE CERTIFIED
SNFs, HHAs, AND SWING BED HOSPITALS
SELECTED YEARS, 1983 - 1990

YEAR	SNFs	Percent Change	HHAs	Percent Change	Swing Bed Hospitals	Percent Change
1983	5,760		4,235		149	
1985	6,725	16.8%	5,932	40.1%	771	417.4%
1987	7,379	9.7%	5,755	-3.0%	1,270	64.7%
1989	8,688	17.7%	5,661	-1.6%	1,236	-2.7%
1990	8,937	2.9%	5,730	1.2%	1,216	-1.6%

Source: HCFA Office of Research and Demonstrations

Note: Numbers represent facilities participating as of December of each year shown

Table 2-9

TRENDS IN UTILIZATION OF MEDICARE HOME HEALTH AGENCY SERVICES - - PERSONS SERVED AND HOME HEALTH VISITS

	Persons Served				Home Health Visits					
Year	Number (000)	Percent Change	Per 1000 Enrollees	Percent Change	Number (000)	Percent Change	Per Person Served	Percent Change	Per 1000 Enrollees	Percent Change
----										
1980	957.4	--	34	--	22,428	--	23	--	788	--
1982	1,171.9	22.4%	40	17.6%	30,787	37.3%	26	13.0%	1,044	32.5%
1983	1,351.2	15.3%	45	12.5%	36,844	19.7%	27	3.8%	1,227	17.5%
1984	1,515.9	12.2%	50	11.1%	40,337	9.5%	27	0.0%	1,324	7.9%
1985	1,588.6	4.8%	51	2.0%	39,742	-1.5%	25	-7.4%	1,279	-3.4%
1986	1,600.2	0.7%	50	-2.0%	38,359	-3.5%	24	-4.0%	1,208	-5.6%
1987	1,564.5	-2.2%	48	-4.0%	36,088	-5.9%	23	-4.2%	1,113	-7.9%
1988	1,601.7	2.4%	49	2.1%	37,713	4.5%	24	4.3%	1,144	2.8%
1989	1,724.9	7.7%	51	4.1%	47,258	25.3%	27	12.5%	1,407	23.0%

Source: HCFA Office of Research and Demonstrations.

Notes: Data are based on claims processed through December 31, 1990 and include PPS waiver States.

Chapter 3

Impact on Hospitals

This chapter updates the information presented in earlier reports on trends in inpatient hospital utilization and finances to include data for the sixth year of PPS. The following topics are reviewed: (1) long-run industry trends in revenues, expenses and employment; (2) trends and variation in total facility margins; (3) increases in Medicare inpatient costs and revenue; and (4) trends and variation in Medicare inpatient margins.

Total Hospital Revenues, Expenses and Employment

The aggregate trends in hospital data point to a robust and economically viable industry. Although there are legitimate concerns about inflation in the hospital market and access to care (partially reflected in the problem of the uninsured), the industry as a whole in 1989 was in sound economic health. The implementation of PPS somewhat interrupted the upward movement of a number of the trends reflecting the hospital industry's general economic health. Nevertheless, most of the trends that were affected by the implementation of PPS reestablished themselves within 2 or 3 years. Despite the strong performance of the industry as a whole, there is considerable variation in financial viability across different groups of hospitals.

Proportion of Gross National Product (GNP) Devoted to Acute Hospital Care

In 1963, revenues for acute care hospitals represented about 1.3 percent of GNP (using revenue data from the AHA Panel Survey, 1991, and GNP data from the Economic Report of the President, 1991). Since that time this percentage has grown about threefold so that in 1990 it stood at 4.2 percent of GNP. In addition, except for some sporadic instances (1965, 1973, 1978 and 1984-85), these increases have been consistently positive (see Figure 3-1).

Over this period, the percentage of GNP represented by acute care hospital revenues grew at an average rate of 0.1 percent per year. Even though the coming of PPS appears to have had a temporary negative effect on the growth in this percentage, as evidenced by the 1984-86 period in Figure 3-1, the historical trend subsequently seems to have been reestablished.

Hospital Revenues, Expenses, Margins and Profits

Over the period 1963 to 1990, expense per case grew at an average annual rate of 10.9 percent while revenue per case grew at an average annual rate of 11 percent, both well above the average

annual consumer price index (CPI) increases of 5.4 percent for this period. Part of the difference between the hospital and general inflation levels is attributable to increases in the expansion and intensity of hospital services, but another part is attributable to inflationary pressures in the industry over and above the rest of the economy.

An examination of the hospital inflation rate shows a drop from around 15 percent on a per admission basis to 8 or 9 percent coincidental with the Tax Equity and Fiscal Responsibility Act (TEFRA) and PPS. Although at first it might appear that PPS caused this decline, this is not the case. Focusing on the recent history of this phenomenon it is possible to divide the 12 years into two distinct periods for comparison purposes, 1978-1983 and 1983-1990. The 5 year 1978-1983 period immediately preceded PPS. During the 7 year period 1983-1990, PPS was phased in and became fully operational. During the 1978-1983 period, average annual cost and revenue per case rose respectively 12.5 percent and 12.9 percent and during the 1983-1990 period these had each dropped to 8.6 percent. These decreases are not necessarily attributable to PPS, however, since the general inflation rate had fallen from an average annual rate of 8.5 percent during the earlier period to 3.9 percent during the later period.

To control for the overall inflation rate, Figure 3-1A shows the difference between hospital inflation (in expense per case) and the general inflation rate (as seen in the CPI). Although there is some variation in this difference over the period 1978-1983, it has fluctuated around 4.5 percent. In fact, the difference between the hospital inflation rate and the general inflation rate was actually a little greater during 1983-1990 (4.7 percent) than during 1978-1983 (4.0-4.5 percent). This indicates that whatever distinct inflationary pressures existed historically in the hospital sector continued in the PPS period.

Table 3.1 shows the growth in total revenue and expense per case, adjusted for outpatient activity, as well as total revenue operating margins. These total margins measure revenue from all sources minus total expenses. They rise when the growth in revenue per case exceeds the growth in expense per case (as they did in 1989) and fall when the opposite is true. The slightly higher growth rate of average revenue over average expense is reflected in a gradual upward trend in total hospital margins from the 2 to 4 percent levels of the 1960's and 1970's to the 4.5 to 6 percent levels of the 1980's.

Hospital margins are often used to measure hospital well-being, but there are other indicators which may be used to give a more complete story. Margins represent the percentage by which revenues exceed costs as part of revenues. But suppose two firms had the same margins but one had costs and revenues double the other. The larger one would be more profitable because it would have larger profits. Thus, we might want to consider total profits as a measure of well-being. In addition, to make year-

to-year comparisons, reported profits should be deflated for changes in prices so that the relevant measure is adjusted for real profits. Finally, we can standardize by the number of admissions and get yet a third criterion, real profits per admission.

The historical total margin series is seen in Figure 3-2. Margins showed a downward trend prior to 1973, rose steadily from 1973 to 1984, peaked in the first 2 years of PPS (1984 and 1985) and declined somewhat thereafter, leveling off from 1986 to 1990. Thus, except for the first 2 years of PPS, total hospital margins have been steady, averaging just under 5 percent, for the last decade. There was no return to the overall upward trend which started in 1973.

Figure 3-3 shows the movements in real profits over the period 1963-1990. Real profits were fairly steady through 1973, rose from 1973 to 1983 at a steady rate, jumped in 1984 and 1985 with the coming of PPS before dropping in 1986 and 1987 and finally edging up to their 1973-83 trend in 1988, 1989, and 1990. Here the picture of current hospital industry well-being is more sanguine than that shown by the margins. Real profits, appear to currently be growing at or near the historical rate for the 18 year period beginning in 1973. The latest year, 1990, is the peak year with real profits at $8.4 billion in 1982-84 dollars (nominal profits were $10.9 billion).

Profits per admission are shown in Figure 3-4. In this graph, real profits per admission are steady through 1973 but rise thereafter with a jump again in 1984 and 1985, a drop in 1986 and 1987, and the resumption of the old upward trend in 1988, 1989 and 1990 (1989 is the peak year).

It is important to understand that the examination of margins is only one, imperfect measure of hospital well-being. If one uses some reasonable alternative measures, another picture of hospital economic health emerges as seen in the two alternative measures developed here.

<u>The Largest Component of Hospital Costs - Labor</u>

We might also view the economic health of the hospital industry in terms of what has occurred to earnings and employment in the industry. In this case increased spending in the industry has resulted in an increase in demand for labor and this has had positive wage and employment effects.

<u>Earnings Per Worker</u>

Over the 28 year period, 1963-1990, there were two periods during which the average real hospital wage growth differed from the economy wide average. The first was after the onset of Medicare and Medicaid, which had a major impact on the demand for hospital care, and the second was after 1978, a period during which there were substantial gains for hospital workers vis-a-vis other

workers. Figures 3-5 and 3-6 respectively show real earnings rates for hospital workers and all nonsupervisory nonagricultural workers in the economy.

The increase in demand brought about by the implementation of Medicare and Medicaid appears to have increased the real hospital wage by 14 percent over the economy wide real wage. Except for this source of increase, from the early 1960's until the late 1970's, the real hospital wage closely followed the economy's average real wage.

After the late 1970's, the real wage for hospitals increased with respect to the overall real wage. With the onset of the 1980 recession, starting in 1979, both the real wage for hospitals and the overall real wage fell.[1] However, while the former fell only 3.7 percent from 1978 to 1980, the latter fell 7.4 percent. More importantly, the overall real wage did not recover after 1978-80. It was actually 5.1 percent lower in 1990 than in 1980. During this same period the real wage for hospital workers rose 40.1 percent.[2] Although some of the increase for the latest decade is due to increased skill mix, most is not. Using data from 1980 to 1987, Pope and Menke (1990) found that while the real average hourly earnings in hospitals rose 16 percent (an increase that looks a bit low when compared with AHA Panel data), skill mix rose only 2.9 percent. They note that:

> "...[e]ven if our estimate of skill mix improvement is as little as half of the true value, the majority of hospital wage increases in the 1980's cannot be explained by a more expensive skill mix.".

Hospital Employment

Hospital employment has experienced extraordinary growth since the early 1960's both in absolute terms and in relationship to the growth in labor employed in the rest of the economy. From 1963 to 1990, the number of employees in the hospital industry grew 172.3 percent according to AHA Panel Survey data. This growth figure contrasts sharply with the overall growth in total nonagricultural employment in the economy, 81.9 percent (Economic

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[1] The real wage for hospitals is calculated as the nominal payroll per year from AHA Panel Survey data, 1991, and this is deflated by the CPI from page 351 of the Economic Report of the President, 1991, and the latter is average hourly earnings for private nonagricultural production and nonsupervisory workers divided by the CPI, from pages 336 and 351 respectively of the Economic Report of the President, 1991.

[2] The data used here do not include employee benefits. These are not available for hospitals prior to 1976. An examination of the period from the late 1970's to 1988 including benefits does not change the results for this period in a substantive way.

Report of the President, 1991). Standardizing by hours worked to obtain full time equivalent (FTE) employment shows that, whereas in 1963 there were 1.3 million FTE employees in acute care hospitals, by 1990 there were 3.2 million (see Figure 3-7). Much of this increase reflects an increase in intensity of care as the adjusted FTE per 100 census nearly doubled over this period (see Figure 3-8).

PPS appears to have somewhat curtailed the upward movement of employment of hospitals. As shown in Figure 3-7, the number of FTEs fell as PPS was phased in. After the initial adjustment however, the number of employees again trended upward rising about 184,000 between 1985 and 1990. Employment intensity as well, as shown in Figure 3-8, appears to have leveled off.

Services Offered by Hospitals

Another indicator of the economic health of the hospital industry is its continued expansion of both the number and type of sophisticated services offered. Cromwell and Butrica (1991) use AHA Hospital Statistics to describe what they termed a dramatic change in hospitals' scope of services. They report that:

> "...[s]ervices such [as] diagnostic X-ray, the operating room, EKG's, and the clinical lab had completely diffused by 1963. These services had become so commonplace among hospitals that the AHA no longer reported them after 1969. Conversely, there are 36 new services that the AHA currently reports (or did as of 1980) that were not available in 1963, including MRI, open-heart surgery, and organ transplant.. Many of these services rely on computers and lasers, technologies that were in their infancy in 1963.".

Moreover, the data they analyze show that these advances continued in the 1980's with no let up for PPS. Again Cromwell and Butrica report that "[t]he growth in both diagnostic and therapeutic ancillary services..." and "...[t]oday, one-in-four hospitals perform cardiac catheterizations and renal dialysis; one-in-six provide MRI and open heart surgery; and one-in-ten perform organ transplants." In general they report both the continuous adoption of new services and a "net positive diffusion" of these services as well (over the whole period including PPS).

Trends in Total Facility Margins and their Distribution

The AHA Panel Survey data presented in the previous section provide a picture of aggregate hospital industry financial performance. However, to evaluate variation in overall financial performance by hospital groups, data from HCFA's Hospital Cost Information System (HCRIS) based on the Medicare Cost Report is used.

ProPAC (1990) has found that HCRIS data on total margins is comparable to the total margin data derived from the AHA Annual Survey. One artifact of differences in reporting procedures used by AHA Annual Survey and HCFA is that average total margins computed from HCRIS data are about one-half percent lower than total facility margins computed from AHA Annual Survey data. Differences in sampling procedures result in differences in estimates of total margins between the AHA Panel Survey and both the AHA Annual Survey and HCRIS data. Other differences may be due to the longer time series presented earlier. Nevertheless, the trends shown by these three sources of hospital financial data document similar trends in hospital profitability.

Total facility margins are defined as total hospital revenue from all sources minus all hospital costs divided by total hospital revenue. As shown in Table 3.2, total margins declined in PPS-2 and PPS-3. Since PPS-3, total margins have remained relatively constant. Consistent with the analysis in the previous section, the data show that the hospital industry overall is profitable.

Variation in Total Facility Margins

As noted in previous studies of hospital financial performance (ProPAC, 1992), there has been wide variation in the overall performance of hospitals in recent years. The data in Table 3.3 show trends in total facility margins by percentile group from PPS-1 to PPS-6. Significant variation in total margins across percentile groups is evident in each PPS year, but the observed variation has remained relatively constant since PPS-3.

The data in Table 3.3 also indicate that median (50th percentile) total margins have declined from PPS-1 as has the percent of hospitals with total margins greater than or equal to zero. The percent of hospitals with total inpatient margins greater than or equal to zero has declined from 80.3 percent in PPS-1 to 68.2 percent in PPS-6. However, both median margins and the percent of hospitals with total margins greater than or equal to 0 have remained relatively constant since PPS-3.

Similar trends are evident when percentile groups are examined. Total margins for hospitals in the 10th percentile declined from -4.9 percent to -10.0 percent while margins for hospitals in the 90th percentile declined from 18.6 percent to 11.4 percent. During this period, total margins for hospitals in the 10th percentile declined slightly in the first 2 years of PPS but total margins for hospitals in the 90th percentile showed a greater decline during this period. Total margins for all percentiles shown in Table 3.3 changed very little from PPS-3 to PPS-6.

Trends in Total Facility Margins by Hospital Group

Total facility margins have also varied systematically across hospital groups as Table 3.2 indicates. For most hospital

groups, total margins have declined but some hospital groups have fared consistently better than others. Generally, increasing size and occupancy rates are associated with higher total margins. However, major teaching hospitals and government hospitals have tended to have below average total margins.

Urban Hospitals

Although total margins for urban hospitals were higher than rural total margins for the first 4 years of PPS, rural hospital total margins were higher in PPS-5 while, in PPS-6, total margins for urban and rural hospitals were approximately equal. Total margins have declined from 9.4 percent in PPS-1 to 3.7 percent in PPS-6, but have remained relatively constant during the last 3 PPS years. Hospitals in large urban areas had total margins that have been generally below the national average during PPS. Their total margins have declined from 10.3 percent in PPS-1 to 2.7 percent in PPS-6 and reflect the performance of major teaching hospitals which are predominantly located in large urban areas.

Other urban hospitals have had total margins decline from about 10 percent in PPS-1 to 4.8 percent in PPS-4 but remain relatively constant in later years. Despite declining during PPS, total margins for other urban hospitals have generally been above the national average.

Larger urban hospitals have had higher total margins than smaller urban hospitals in each year of PPS. Urban hospitals with 300 or more beds have had total margins that were generally above the national average in each year of PPS. In contrast, urban hospitals with fewer than 100 beds had total margins that were significantly below the national average and were approximately 0 during PPS-4 and PPS-5.

Rural Hospitals

Total facility margins for rural hospitals were lower than the national average during the first four years of PPS but have been above the national average since PPS-5. Total margins for rural hospitals have declined from 6.7 percent in PPS-1 to 4.0 percent in PPS-6 (Table 3.2).

Total margins tended to increase with bedsize group for rural hospitals in each PPS year. Generally, larger rural hospitals (150 or more beds) had total margins near the national average. In contrast, rural hospitals with fewer than 100 beds had margins that were well below the national average during PPS. Hospitals with fewer than 50 beds had total margins very near 0 in PPS-5 and PPS-6. The data presented for both small urban and small rural hospitals indicate that these facilities have been barely profitable over all their inpatient, outpatient and non-patient activities during PPS. Much of their constrained profitability is due to their small scale.

In the first 4 years of PPS, SCHs had total facility margins that were below the national average. In PPS-5 and PPS-6, total margins for SCHs have been slightly higher than the national average. Total margins for these hospitals should increase in future years due to changes in SCH payment rules contained in OBRA 1989 and implemented in April 1992 to permit these hospitals the choice of hospital-specific rates based on either 1982 or 1987 cost per discharge data or the Federal rate.

Throughout PPS, RRCs have had total facility margins that have been significantly above the national average (Table 3.2). These hospitals are larger than the average rural hospital and have maintained a high volume of inpatient and outpatient services.

Teaching Hospitals

Except for the first year of PPS, major teaching hospitals (ratio of residents to beds of .25 or greater) had total margins that were approximately 2 to 3 percent below the national average. Some of the reduced profitability of these hospitals may be due to losses incurred in the treatment of indigent and Medicaid patients in either inpatient, outpatient clinic or emergency room settings or increased debt financing to acquire the latest medical technology. The comparatively low overall profitability of major teaching hospitals contrasts sharply with the exceptionally profitable performance of major teaching hospitals in treating Medicare inpatients as will be shown later.

Total facility margins for minor teaching hospitals (ratio of residents per bed greater than 0 but less than .25) have consistently been above the national average in each PPS year. Beginning in PPS-4, non-teaching hospitals had higher margins than minor teaching hospitals.

Disproportionate Share Hospitals

Hospitals receiving DSH payments had below average total facility margins as shown in Table 3-2. Non-DSH hospitals have had higher total margins than any group of hospitals receiving DSH payments. Urban DSHs with over 100 beds have had total margins that have been declining from 9.8 percent in PPS-1 to 2.6 in PPS-6. Their overall performance is affected by the high proportion of teaching hospitals in this group.

Urban DSHs under 100 beds have had total margins that were well below average throughout PPS and had negative total margins in PPS-4 and PPS-5. Their performance reflects the weak performance of all small (under 100 bed) urban hospitals.

Rural hospitals receiving DSH payments have had total margins that were above the average for all rural hospitals in the first two years of PPS. However, total margins for rural DSH hospitals have declined in recent years and are below total margins for all rural hospitals.

Occupancy Rates

Hospitals with higher occupancy rates have generally had higher total facility margins. Hospitals with occupancy rates of 50 percent or greater have consistently had total margins at or above the national average.

In contrast, hospitals with occupancy rates of 20 percent or less had total margins that were well below the national average and had negative margins beginning in PPS-3. These data clearly indicate that low occupancy rates are associated with low total facility margins as indicators of poor financial performance. In the section to follow, it will be shown that hospitals with low occupancy rates also have very low Medicare margins.

Trends in PPS Costs, Revenues and Operating Margins

The data on total facility margins presented in the previous section provide a picture of overall hospital financial performance. However, to assess whether PPS payments are sufficient to pay the costs that PPS was expected to cover, one must examine trends in Medicare inpatient costs, revenue and margins. The Medicare inpatient cost and revenue data used here exclude the costs of capital and direct medical education expenses.

Medicare inpatient margins are defined as Medicare inpatient revenue minus Medicare inpatient costs divided by Medicare inpatient revenue. As shown in Table 3.4, Medicare margins have declined annually since PPS-1 when the national average margin was 13.5 percent. However, PPS-6 is the first year where the national average Medicare margin has been negative (- 0.55). As discussed in the previous section, total hospital margins during recent PPS years (PPS-5, PPS-6) were about 4 percent and reflected the overall profitability of the hospital industry.

Trends in Medicare Payments and Costs

Trends in Medicare margins can be explained by examination of the factors affecting Medicare inpatient payments and costs. The 13.5 percent Medicare margin for PPS-1 was largely due to the 11.3 percent increase in Medicare inpatient payments from TEFRA coupled with a corresponding increase in costs of 2.1 percent (Table 3.5). The increases in payments and costs during PPS-1 represent high/low extremes, respectively, since PPS was introduced.

Since PPS-1, Medicare inpatient costs have increased by about 10 percent each year. This has led many observers to suggest that although Medicare could claim a one-time, significant reduction in inpatient costs in 1984, Medicare prospective payment has not been able to reduce the rate of increase in

inpatient costs appreciably below the 10 percent yearly rate of increase in costs that prevailed before the implementation of PPS.

The rate of increase in PPS payments per case declined to 5.5 percent in PPS-6 compared to increases of 6 percent in PPS-4 and 7.5 percent in PPS-5. During these years, the difference between the rates of increase in costs and payments per case grew from 3.3 percent in PPS-4 to 4.8 percent in PPS-6. The interplay of factors affecting payments and costs will determine the level of Medicare inpatient margins in the future.

Factors Affecting PPS Payments Per Case

The rate of increase in PPS payments per case is largely determined by changes in the annual update for PPS rates and changes in the Medicare CMI. The discussion that follows describes how changes in these two factors have affected PPS payments per case.

The PPS Update Factor

The PPS update factor granted by Congress determines the annual rate of increase in PPS standard payment amounts. The update factor reflects estimates of "true" change in the CMI and changes in the Medicare market basket index.[3] Beginning in April, 1988, large urban, other urban and rural hospitals were granted separate updates. Table 3.5 displays the PPS update factors for FY 1984 through FY 1989. While the update for FY 1984 was equal to the increase in the Medicare market basket index, subsequent update factors were below the increase in the market basket especially where budgetary reductions took place (FY 1986 - FY 1988 as indicated in the footnote in Table 3.5).

During FY 1989, the average update was 3.5 percent. This was the largest update granted since FY 1985. Large urban hospitals received a 3.4 percent update, other urban hospitals received a 2.9 percent update and rural hospitals received a 3.9 percent update. However, these updates were below the market basket increase of 5.4 percent.

Case Mix Index (CMI) Increases

The Medicare CMI has increased steadily since PPS-1 (Table 3.6). Recent CMI increases have added from 2-4 percentage points to revenue growth since PPS-2. The 2.7 point growth in the CMI between PPS-5 and PPS-6 was slightly less than the 3.4 percent growth in the CMI between PPS-4 and PPS-5.

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[3]The "market basket index" is an index of the national average annual change in the prices of goods and services hospitals purchase to provide inpatient care.

As shown in Table 3.6, CMI increases have tended to be higher for teaching hospitals, large urban hospitals, DSH, and proprietary hospitals. The CMI increases have tended to be lower for rural hospitals (especially SCH) and government hospitals in PPS-6 as well as cumulatively from PPS-1 to PPS-6.

Estimates of "real CMI change" (within-DRG severity and distributional change across DRGs, but not change in reporting or upcoding) are factored into the PPS update factor. The RAND Corporation has examined the change in the Medicare CMI during PPS in research studies jointly funded by HCFA and the ProPAC. This research has monitored the extent to which overall case mix change represents real change or "DRG creep" due to upcoding.

The initial RAND analyses for 1984 found substantial coding effects, but much of this was due to inconsistency in Medicare case mix data between 1981 and 1984 (Ginsburg and Carter, 1986).

An update of this study found that approximately two-thirds of the change in the CMI between 1986 and 1987 is real change (Carter, et. al., 1990a). Similarly, RAND has recently found that about half the change in the CMI between 1987 and 1988 is real change (Carter, et al., 1990b). The authors also suggest that major changes in DRG grouper case assignment from year to year can cause increases in the CMI.

Changes in Medicare Operating Costs

After a cost increase of only 2.1 percent from TEFRA to PPS-1, the annual growth in Medicare inpatient operating costs per case has ranged between 9 percent and 11 percent from PPS-2 to PPS-6. These data suggest that little change in the rate of cost increase occurred during this period.

If inpatient costs were fixed (i.e., not a function of number of discharges), the expected change in cost per case would be (1 + change in Market Basket)/(1 + change in discharges). If actual cost per discharge increases are less than expected, cost reduction is suggested. If cost per discharge increases are greater than expected, then either hospital production is more resource-intensive and/or output prices are increasing faster than input prices and no cost reduction is indicated.

Using this framework, expected increases in cost per discharge were 10.4 percent in PPS-1, 13.6 percent in PPS-2, 9.2 percent in PPS-3, 6 percent in PPS-4, 3.7 percent in PPS-5 and 3.5 percent in PPS-6. When the PPS-1 actual and expected increases are compared (Table 3.5), it is evident that major cost savings occurred which are possibly attributable to decreased length of stay, reductions in employment and shifting care to ambulatory settings.

In PPS-2, only slight cost reduction occurred. Although payments per case declined slightly from PPS-1, cost per discharge increased in excess of 10 percent as in years before PPS. The

discrepancy between actual and expected cost per discharge also shows diminished likelihood for cost savings. Together, these data suggest that the cost savings experienced during PPS-1 were a "one time" event. Data for the years from PPS-3 onward are consistent with this interpretation.

Variation in Medicare Margins

As described in earlier reports, there has been wide variation in the performance of hospitals under PPS. The data in Table 3.7 show trends in Medicare inpatient margins by percentile group from PPS-1 to PPS-6. Wide variation in margins across percentile groups is evident in each PPS year, but it is also apparent that the variation across percentile groups has increased annually.

The data in Table 3.7 also indicate that median (50th percentile) margins have declined sharply, as has the percent of hospitals with Medicare inpatient margins greater than or equal to zero. Median margins have declined from 11.3 percent in PPS-1 to -3 percent in PPS-6. Similarly, the percent of hospitals with Medicare inpatient margins greater than or equal to zero has declined from 83.1 percent in PPS-1 to 52 percent in PPS-5. In PPS-6, only 43.1 percent of hospitals had positive margins. The extent of decline in Medicare margins has been greater for hospitals in the lower percentile groups. Margins for hospitals in the 10th percentile declined from -5.1 percent to -29.6 percent. In contrast, margins for hospitals in the 90th percentile declined from 22.8 percent to 16.8 percent.

As the overall Medicare margins have declined from PPS-1 to PPS-6, hospitals with relatively low margins have experienced much greater declines than hospitals with relatively high margins. Margins have declined relatively slightly among hospitals doing well under PPS in a given year.

Trends in PPS Margins by Hospital Group

Medicare inpatient margins have also varied systematically across hospital groups as Table 3.4 indicates. In most cases, margins have declined for all of the hospital groups displayed but some groups of hospitals have fared consistently better than others. Overall, size and occupancy are positively associated with higher margins as are additional payments for teaching and DSH status.

Urban Hospitals

Although margins for urban hospitals have declined from 14.4 percent in PPS-1 to 1.0 percent in PPS-6, urban hospital margins have remained higher than the national average throughout PPS. Hospitals in large urban areas have fared best under PPS; their margins have generally been about 1 percent above the national average. However, their PPS-6 margin was 0.4 percent.

Although other urban hospitals have not fared as well as large urban hospitals, they have also had margins greater than the national average in each PPS year. They also had a negative Medicare inpatient margin (-0.1 percent) in PPS-6.

Larger urban hospitals have had higher margins than smaller urban hospitals in each year of PPS. Urban hospitals with 300 or more beds have had margins that were well above the national average in each year of PPS. In PPS-6, when most groups of hospitals had negative margins, the average margin for these hospitals was still positive. In contrast, urban hospitals with fewer than 300 beds had margins that were significantly below the national average and had negative Medicare margins in PPS-6. Teaching and DSH payments have significantly improved Medicare margins for those hospitals receiving them in each PPS year, and it appears that the impact of these payments has increased over time. Urban hospitals receiving both teaching and DSH payments have had margins that have been historically higher than the average for urban hospitals. This is especially evident in PPS-6 where urban hospitals receiving both teaching and DSH payments had a Medicare margin of 5.4 percent. In contrast, urban hospitals receiving only teaching or only DSH payments had margins of -0.2 percent and -0.2 percent respectively in PPS-6. Urban hospitals receiving neither adjustment had a Medicare margin of -5.9 percent in PPS-6. This suggests that teaching and DSH payments are very important contributors to the fiscal well-being of urban hospitals, especially if both adjustments are received. Indeed, since payments became effective in May 1986, the difference in margins between urban hospitals receiving both adjustments and those receiving neither adjustment has grown.

<u>Rural Hospitals</u>

Medicare inpatient margins for rural hospitals have been from 4-7 percent lower than the national average throughout PPS. Margins for rural hospitals have declined from 8.9 percent in PPS-2 to -4.6 percent in PPS-6 (Table 3.4). Rural hospital margins were also negative in PPS-5.

Although margins tended to increase with bedsize group for rural hospitals from PPS-1 to PPS-4, this trend is not evident in either PPS-5 or PPS-6. Rural hospitals with fewer than 50 beds have had negative margins since PPS-3. In PPS-6, each rural hospital bedsize group had a negative margin. However, Medicare margins for rural hospitals should improve in future years, because the PPS update for rural hospitals has been and will continue to be increased to allow rural rates to become equal to rates for other urban hospitals by FY 1995.

SCHs historically have had Medicare margins that were below the average for all rural hospitals. However, margins for SCHs have declined significantly relative to the rural average since PPS-4. The PPS-6 margin for SCHs is -9.2 percent, which is low in comparison to other hospital groups and is of concern since these hospitals were paid primarily a hospital-specific rate based on

costs per discharge in 1982. Changes in SCH payment rules contained in OBRA 1989 to permit these hospitals the choice of hospital-specific rates based on either 1982 or 1987 cost per discharge data or the Federal rate should raise margins for these hospitals in future years since these provisions were not implemented until April 1990.

RRCs historically have had higher Medicare margins than most rural hospitals and avoided negative margins during PPS-5 (Table 3.4). The Medicare margin for RRCs became negative (-1.7 percent) in PPS-6 but, nevertheless, was significantly higher than the average Medicare margin for rural hospitals in PPS-6.

Teaching Hospitals

As a group, teaching hospitals have had very high Medicare margins under PPS. Their sustained strong performance is notable since the IME adjustment had been reduced from 11.6 percent to 7.5 percent in 1987. The statutory changes affecting the IME adjustment have been described in detail in previous reports.

Despite the reductions in the IME adjustment, the hospitals benefitting the most from this adjustment, major teaching hospitals (.25 or more residents per bed), have had exceptionally high margins throughout PPS. Major teaching hospitals have had their margins decline less than any other hospital group during PPS. As shown in Table 3.4, major teaching hospitals had margins of 15.9 percent in PPS-1 and 19.6 percent in PPS-2 and continued to maintain Medicare margins in excess of 10 percent through PPS-5 despite the reductions in the IME adjustment noted earlier. However, IME reductions were probably counterbalanced by the institution of DSH payments which strongly benefitted teaching hospitals. Even in PPS-6 when many urban hospitals had negative margins, major teaching hospitals had a Medicare margin of 7.8 percent.

Major teaching hospitals have been consistently big winners under PPS for a several reasons: high patient volume, high CMI, high occupancy rates, generally higher standardized amounts and wage indices due to location in large urban areas, high level of outlier cases, and high level of DSH payments. Some of these factors, most notably DSH payments, interact with the IME adjustment to possibly overcompensate major teaching hospitals. Major teaching hospitals also have had higher rates of cost reduction, which suggests that they were in a better position to achieve efficiencies.

Minor teaching hospitals (ratio of residents per bed greater than 0 but less than .25) have had lower Medicare margins than major teaching hospitals but have generally fared as well as the average large urban hospital. The PPS-1 margin for other teaching hospitals was 15.2 percent but declined to 5.3 percent in PPS-5. In PPS-6, minor teaching hospitals had a Medicare margin of 0.8 percent. Minor and major teaching hospitals share

many of the same characteristics described earlier that predispose hospitals to high margins under PPS.

Disproportionate Share Hospitals

DSH payments have had differing impacts on Medicare margins depending on the size and location of hospitals receiving DSH payments. Urban DSHs with over 100 beds have had margins that have been above the average for urban hospitals since PPS-1; their PPS-6 margin was 3.7 percent. This was substantially higher than the PPS-6 margins for urban hospital groups over 100 beds.

Urban DSHs under 100 beds have not had margins as high as those of DSHs over 100 beds but have had margins that have been much higher than those of small urban hospitals overall since PPS-1. Their PPS-6 margin was 0.7 percent, which was much higher than the PPS-6 margins for urban hospital groups under 100 beds.

Rural hospitals receiving DSH payments have had margins that have been far higher than other rural hospitals historically. DSH payments have especially benefitted these hospitals in the last 2 years; their margins have remained positive (4.5 percent in PPS-5 and 3.7 percent in PPS-6) while the average rural margin has been negative in these years.

Occupancy Rates

In each PPS year, hospitals with higher occupancy rates had higher Medicare inpatient margins. Hospitals with occupancy rates of 70 percent or greater have consistently had the highest PPS margins of any occupancy group. Margins for this group ranged from 14.5 percent in PPS-1 to 1.9 percent in PPS-6.

In contrast, hospitals with occupancy rates of 35 percent or less had margins that were well below the national average. Indeed, this group had negative margins beginning in PPS-3 and appear to be clearly not doing well under PPS as evidenced by negative margins for this group from PPS-3 (-4.2 percent) through PPS-6 (-13.6 percent). The data in Table 3.4 strongly indicate that low occupancy rates are directly associated with low Medicare inpatient margins.

Comparing Medicare and Total Facility Margins

As ProPAC (1992) has observed, total facility and Medicare inpatient margins have declined since PPS-1 but the decline in Medicare margins has been much more pronounced than the decline in total margins. Indeed, total margins have appeared to remain relatively stable in recent years while Medicare margins have continued to decline.

Generally, hospitals with high Medicare margins tend to have high total margins. This is especially evident when hospitals are

examined by bed size and occupancy rate groups. However, while major teaching hospitals have had high Medicare margins throughout PPS, they have had low total margins during this period. Also, in PPS-5 and PPS-6, total margins for rural hospitals exceed those of urban hospitals while their Medicare margins remain lower than those of urban hospitals.

ProPAC (1992) suggests that the increasing difference between total margins and Medicare margins across hospital groups indicates that cost shifting has probably increased. It is not possible to present an analysis of this issue in this report since more detailed information concerning patterns of inpatient and non-patient costs and non-Medicare revenues is needed to understand how costs and revenues have changed in recent years and the extent to which cost shifting has occurred. Trends in total facility margins will become much more important in the analysis of hospital financial status as the transition to prospective reimbursement of capital progresses and prospective payment for outpatient services is implemented in the future.

Table 3.1

Average Annual Growth in Adjusted Revenue and Expense Per Case and Total Hospital Margins: By Five Year Periods 1963-1983 and for Individual Years During PPS

Period	Average Annual Growth: Patient Revenue Per Case	Total Expense Per Case	Years Averaged	Total Margins
1963-68	11.5%	11.3%	1964-68	3.0%
1968-73	9.3	9.7	1969-73	2.0
1973-78	13.0	12.5	1974-78	2.9
1978-82	13.6	13.2	1979-82	4.6
1982-83	9.7	9.7	1983	5.1
1983-84	8.3	7.2	1984	6.2
1984-85	8.8	9.0	1985	5.9
1985-86	8.0	8.9	1986	5.1
1986 to 87	8.6	9.0	1987	4.7
1987 to 88	8.4	8.3	1988	4.8
1988 to 89	9.1	8.9	1989	5.0
1989 to 90	8.8	9.1	1990	4.8

Notes: Cases are defined as admissions adjusted for outpatient activity, equal to the number of admissions multiplied by the ratio of total revenue to inpatient revenue. Average total margin is total revenue operating margin, defined as total revenue minus total expense divided by total revenue.

Source: AHA National Hospital Panel Survey.

Table 3.2

Total Facility Margins by Hospital Characteristic and Year

	PPS-1	PPS-2	PPS-3	PPS-4	PPS-5	PPS-6
National	9.42	7.23	4.97	3.94	4.21	3.68
Urban	9.87	7.38	5.12	4.02	3.95	3.68
Large Urban	10.26	6.84	4.61	3.43	3.32	2.67
Other Urban	9.37	8.08	5.81	4.81	4.78	4.89
Rural	6.70	6.28	4.00	3.39	5.92	3.99
Teaching Status						
Non-Teaching	8.40	7.36	5.30	4.38	5.09	4.44
Minor Teaching	9.97	7.83	5.36	4.08	4.03	4.09
Major Teaching	10.95	5.63	3.46	2.69	2.47	1.12
Disproportionate Share Hospital (DSH) Status						
Non-DSH	9.22	7.64	5.71	4.67	5.46	4.56
Urban DSH Over 100 Beds	9.76	6.68	4.19	3.17	2.76	2.56
Urban DSH Under 100 Beds	2.10	1.36	2.16	-2.56	-3.00	2.64
Rural DSH	7.20	9.90	2.85	3.03	3.90	3.60
Special Treatment Urban Hospitals						
Teaching and DSH	9.97	6.35	4.15	3.00	2.52	2.04
Teaching and No DSH	10.95	7.78	5.62	4.37	4.82	4.55
No Teaching and DSH	8.69	7.17	4.18	3.30	3.10	4.04
No Teaching and No DSH	9.31	8.56	6.66	5.77	5.68	4.97
Special Treatment Rural Hospitals						
Non-SCH/RRC	5.20	3.72	2.53	2.53	1.75	2.59
Sole Community Hospital (SCH)	5.51	4.69	4.54	2.38	4.42	3.70
Rural Referral Center (RRC)	9.69	10.61	6.11	5.40	11.82	6.23
SCH and RRC	11.84	10.55	10.05	7.01	11.78	5.70
Medicare Dependent	3.25	3.64	-0.18	-0.14	1.81	1.85
Type of Ownership						
Voluntary	9.85	7.44	5.17	4.03	4.56	4.14
Proprietary	13.00	11.96	7.23	6.41	6.00	4.09
Government	5.95	3.31	2.84	1.99	1.79	1.70

Table 3.2 (continued)

Total Facility Margins by Hospital Characteristic and Year

	PPS-1	PPS-2	PPS-3	PPS-4	PPS-5	PPS-6
Urban	9.87	7.38	5.12	4.02	3.95	3.64
Bedsize						
0 - 99	3.08	3.91	2.05	-0.01	0.06	1.27
100 - 199	8.92	6.45	3.54	3.07	2.42	2.86
200 - 299	9.59	7.31	4.92	3.75	4.17	3.01
300 - 499	8.86	7.07	5.26	4.55	4.45	4.73
Over 500	13.89	9.36	6.69	4.97	4.82	3.77
Rural	6.70	6.28	4.00	3.39	5.92	3.99
Bedsize						
0 - 49	4.42	2.25	1.13	-0.50	0.55	0.95
50 - 99	3.75	3.95	2.43	2.66	3.12	1.31
100 - 149	7.89	5.39	4.33	3.41	3.72	6.48
150 - 200	10.50	6.21	6.18	6.02	6.13	5.83
Over 200	9.67	13.15	6.62	5.17	14.61	6.05
Occupancy Rate						
0 - 20%	2.73	0.39	- 3.74	-6.27	-3.56	- 3.28
20 - 35%	6.54	2.53	0.70	0.27	-0.81	2.16
35 - 50%	7.50	6.45	4.47	4.02	3.91	3.86
50 - 70%	9.21	7.68	5.50	4.93	4.56	4.28
70 - 100%	11.55	7.86	5.35	3.93	4.73	3.78
Number of Hospitals	4,771	4,944	5,185	5,172	5,226	5,171

Notes: Data are for an unmatched set of hospitals. Urban hospitals are located within MSAs; rural hospitals are those not located in MSAs. Minor teaching hospitals have a ratio of residents to beds of less than .25; major teaching hospitals have a ratio of greater than .25. Large urban hospitals are those in MSAs with population over 1,000,000. Other urban hospitals include hospitals in MSAs under 1,000,000 population. Disproportionate share and special treatment hospitals are those which satisfy relevant PPS definitions and regulations. Medicare utilization equals Medicare patient days as a percent of total patient days.

Source: HCFA Bureau of Data Management and Strategy. Data development by HCFA Office of Research.

Table 3.3

Distribution of Total Facility Margins by Percentile Group and Percent with Margins Greater than Zero

Percentile Distribution	PPS-1	PPS-2	PPS-3	PPS-4	PPS-5	PPS-6
10th percentile	-4.9	-6.9	-10.0	-11.0	-11.6	-10.0
25th percentile	1.2	0.2	-1.9	-2.6	-2.6	-1.7
50th percentile	6.1	4.6	3.1	2.5	2.6	2.9
75th percentile	10.8	9.2	7.3	6.7	6.9	7.0
90th percentile	18.6	14.5	11.7	11.1	11.4	11.4
Percent with positive margins	80.3	76.1	68.5	65.8	66.2	68.2
Total number of hospitals	4,715	4,908	5,154	5,138	5,193	5,132

Source: Medicare Cost Reports, Bureau of Data Management and Strategy, HCFA. Data development by Office of Research, HCFA.

Table 3.4

Medicare Margins by Hospital Characteristic and Year

	PPS-1	PPS-2	PPS-3	PPS-4	PPS-5	PPS-6
National	13.51	13.74	9.86	6.20	3.57	- 0.55
Urban	14.44	14.56	10.87	7.15	4.39	0.10
Large Urban	14.37	14.12	11.35	7.14	4.59	0.35
Other Urban	14.53	15.09	10.26	7.17	4.05	- 0.14
Rural	8.32	8.90	3.42	0.16	-1.51	- 4.61
Teaching Status						
Non-Teaching	11.63	10.76	6.37	2.76	-0.33	- 4.22
Minor Teaching	15.17	15.53	11.42	7.73	5.25	0.81
Major Teaching	15.89	19.62	16.84	13.20	12.07	7.82
Disproportionate Share Hospital (DSH) Status						
Non-DSH	13.05	12.96	8.16	3.84	0.76	- 3.52
Urban DSH Over 100 Beds	14.44	15.20	12.59	9.73	7.80	3.71
Urban DSH Under 100 Beds	14.29	12.33	7.33	7.29	2.02	0.70
Rural DSH	11.38	12.72	7.59	5.11	4.51	4.08
Special Treatment Urban Hospitals						
Teaching and DSH	15.21	16.52	13.90	11.05	9.37	5.36
Teaching and No DSH	15.76	16.72	11.91	7.25	4.68	- 0.20
No Teaching and DSH	12.77	12.24	9.22	6.53	3.94	- 0.20
No Teaching and No DSH	13.15	11.42	6.86	2.47	-1.72	- 5.92
Special Treatment Rural Hospitals						
Non-SCH/RRC	7.58	6.68	0.96	-2.46	-4.06	- 6.30
Sole Community Hospital (SCH)	8.07	6.38	1.03	-2.07	-4.49	- 9.21
Rural Referral Center (RRC)	9.95	12.93	7.70	4.23	2.06	- 1.65
SCH and RRC	6.64	13.19	9.57	5.47	2.94	- 3.04
Medicare Dependent	7.73	6.93	-0.61	-2.99	-2.41	- 3.84
Type of Ownership						
Voluntary	14.03	14.49	10.75	6.97	4.12	- 0.03
Proprietary	13.91	13.01	8.32	4.69	0.92	- 3.67
Government	10.46	9.96	5.76	3.24	2.74	- 0.92

Table 3.4 (continued)

Medicare Margins by Hospital Characteristic and Year

	PPS-1	PPS-2	PPS-3	PPS-4	PPS-5	PPS-6
Urban	14.44	14.56	10.87	7.15	4.39	0.10
Bedsize						
0 - 99	13.22	12.67	7.30	3.62	0.61	- 1.74
100 - 199	12.85	13.39	7.85	4.60	1.89	- 2.20
200 - 299	13.61	12.52	9.38	5.08	1.65	- 2.26
300 - 499	14.93	15.20	12.08	8.46	5.17	1.16
Over 500	16.26	17.36	13.57	9.98	8.84	3.19
Rural	8.32	8.90	3.42	0.16	-1.51	- 4.61
Bedsize						
0 - 49	6.96	6.27	-0.29	-2.71	-2.29	- 2.84
50 - 99	8.06	7.38	1.81	-1.42	-2.80	- 4.73
100 - 149	8.52	7.62	2.68	-0.20	-2.56	- 7.50
150 - 200	8.23	10.60	5.65	2.63	0.59	- 3.83
Over 200	9.78	13.17	7.23	2.64	-0.09	- 3.72
Occupancy Rate						
0 - 20%	6.31	3.44	- 4.18	-8.62	-16.62	-13.59
20 - 35%	10.29	8.60	2.79	-0.70	-3.29	- 4.76
35 - 50%	11.56	11.03	6.32	2.22	-1.02	- 3.64
50 - 70%	14.00	14.01	8.61	5.04	2.20	- 1.77
70 - 100%	14.46	15.49	13.09	9.28	7.14	1.87
Number of Hospitals	4,772	4,944	5,185	5,172	5,226	5,057

Notes: Data are for an unmatched set of hospitals. Urban hospitals are located within MSAs; rural hospitals are those not located in MSAs. Minor teaching hospitals have a ratio of residents to beds of less than .25; major teaching hospitals have a ratio of greater than .25. Large urban hospitals are those in MSAs with population over 1,000,000. Other urban hospitals include hospitals in MSAs under 1,000,000 population. Disproportionate share and special treatment hospitals are those which satisfy relevant PPS definitions and regulations. Medicare utilization equals Medicare patient days as a percent of total patient days.

Source: HCFA Bureau of Data Management and Strategy. Data development by HCFA Office of Research.

Table 3.5

Summary Hospital Data: Changes in Medicare Cost per Case, Payments per Case, Discharges, and Market Basket Index, and Values of Update Factor by Hospital Location, PPS-1 through PPS-6

	PPS-1 1984	PPS-2 1985	PPS-3 1986	PPS-4 1987	PPS-5 1988	PPS-6 1989	Cumulative % Change from PPS-1
Medicare Cost per Case							
All hospitals	2.1%	10.2%	10.1%	9.3%	11.1%	10.3%	59.6%
Urban	1.9	10.6	10.0	9.5	11.5	10.9	62.8
Rural	2.4	9.7	10.1	9.2	10.7	9.5	56.2
PPS Payments per Case							
All hospitals	11.3	9.2	3.4	6.0	7.5	5.5	50.0
Urban	15.1	10.3	4.3	5.8	6.7	5.6	55.6
Rural	7.4	8.0	2.3	6.3	8.5	5.5	43.9
Medicare Discharges							
All hospitals	-4.1	-6.4	-4.5	-2.2	1.0	1.8	-12.9
Urban	-2.2	-4.8	-3.4	-1.3	1.1	1.9	- 7.0
Rural	-6.1	-8.1	-5.8	-3.2	1.0	1.8	-19.3
Medicare Market Basket Index							
All hospitals	5.9	6.375	4.27	3.7	4.7	5.4	34.4
Medicare Update Factor							
All hospitals	5.9	4.4	0.5	1.15	1.6	3.5	17.1
Large Urban	N/A	N/A	N/A	N/A	1.5	3.4	17.0
Other Urban	N/A	N/A	N/A	N/A	1.0	2.9	16.1
Rural	N/A	N/A	N/A	N/A	3.0	3.9	18.3

Notes: All calculations are performed on pairwise matched hospitals (Hospital-weighted). Cumulative 1984-1989 effect of update factors include zero updates for parts of 1986 and 1988 (October 1, 1985-April 31, 1986 and October 1- November 20, 1987, respectively), 0.4 percent update for part of 1988 (November 21, 1987-March 31, 1988), and differential update factors for hospitals in large urban, other urban, and rural areas where applicable (April 1-September 30, 1988).

Sources: Costs, payments, and discharges: Bureau of Data Management and Strategy, HCFA. Data development by Office of Research, HCFA. Update factors and market basket index: Federal Register, January 3, 1984; August 31, 1984; September 3, 1985; September 3, 1986; September 1, 1987; September 30, 1988.

Table 3.6

MEDICARE CASE MIX INDEX TRENDS BY HOSPITAL GROUP*

	Case Mix Index						Percentage Difference			
		PPS Stays				PPS	PPS	PPS	PPS	
Hospital Group	FY84	FY85	FY86	FY87	FY88	FY89	FY84-87	FY87-88	FY88-89	FY84-89
All hospitals	1.1331	1.1813	1.2139	1.2420	1.2843	1.3191	+ 9.6	+ 3.4	+ 2.7	+ 16.4
Urban	1.1701	1.2204	1.2525	1.2806	1.3261	1.3645	+ 9.4	+ 3.6	+ 2.9	+ 16.6
o <100 beds	1.0319	1.0683	1.0888	1.1136	1.1470	1.1692	+ 7.9	+ 3.0	+ 1.9	+ 13.3
o 100-404 beds	1.1442	1.1910	1.2154	1.2410	1.2878	1.3231	+ 8.5	+ 3.8	+ 2.7	+ 15.6
o 405-684 beds	1.2264	1.2884	1.3241	1.3541	1.3988	1.4406	+ 10.4	+ 3.3	+ 3.0	+ 17.5
o 685+ beds	1.2887	1.3413	1.3883	1.4211	1.4687	1.5232	+ 10.3	+ 3.3	+ 3.7	+ 18.2
Rural	1.0345	1.0662	1.0880	1.1103	1.1385	1.1606	+ 7.3	+ 2.5	+ 1.9	+ 12.2
o <100 beds	0.9967	1.0205	1.0205	1.0474	1.0640	1.0811	+ 5.1	+ 1.6	+ 1.6	+ 8.5
o 100-169 beds	1.0445	1.0778	1.1038	1.1256	1.1583	1.1782	+ 7.8	+ 2.9	+ 1.7	+ 12.8
o 170+ beds	1.0851	1.1274	1.1575	1.1845	1.2215	1.2494	+ 9.2	+ 3.1	+ 2.3	+ 15.1
New England	1.1610	1.1876	1.2367	1.2513	1.2856	1.3061	+ 7.8	+ 2.7	+ 1.6	+ 12.5
Mid-Atlantic	1.1527	1.1856	1.2027	1.2254	1.2767	1.3103	+ 6.3	+ 4.2	+ 2.6	+ 13.7
South Atlantic	1.1267	1.1736	1.2060	1.2470	1.2977	1.3372	+ 10.7	+ 4.1	+ 3.0	+ 18.7
E. No. Central	1.1276	1.1741	1.2116	1.2372	1.2738	1.3063	+ 9.7	+ 3.0	+ 2.6	+ 15.8
E. So. Central	1.0706	1.1163	1.1464	1.1724	1.2133	1.2545	+ 9.5	+ 3.5	+ 3.4	+ 17.2
W. No. Central	1.1366	1.1916	1.2312	1.2563	1.2903	1.3186	+ 10.5	+ 2.7	+ 2.2	+ 16.0
W. So. Central	1.1054	1.1583	1.2072	1.2426	1.2802	1.3184	+ 12.4	+ 3.0	+ 3.0	+ 19.3
Mountain	1.1608	1.2185	1.2499	1.2721	1.3047	1.3416	+ 9.6	+ 2.6	+ 2.8	+ 15.6
Pacific	1.1980	1.2503	1.2727	1.2965	1.3420	1.3788	+ 8.2	+ 3.5	+ 2.7	+ 15.1
Major Teaching	1.2780	1.3427	1.3779	1.4063	1.4528	1.4935	+ 10.0	+ 3.3	+ 2.8	+ 16.9
Other Teaching	1.2137	1.2600	1.2885	1.3163	1.3582	1.3993	+ 8.5	+ 3.2	+ 3.0	+ 15.3
Non-Teaching	1.0837	1.1251	1.1474	1.1737	1.2152	1.2461	+ 8.3	+ 3.5	+ 2.5	+ 15.0
Not-for-Profit	1.1552	1.2046	1.2374	1.2641	1.3048	1.3397	+ 9.4	+ 3.2	+ 2.7	+ 16.0
Proprietary	1.0892	1.1363	1.1650	1.1971	1.2557	1.3023	+ 9.9	+ 4.9	+ 3.7	+ 19.6
Government	1.0806	1.1263	1.1521	1.1798	1.2169	1.2445	+ 9.2	+ 3.1	+ 2.3	+ 15.2
Dispropor. Share	1.1621	1.2150	1.2442	1.2732	1.3230	1.3612	+ 9.6	+ 3.9	+ 2.9	+ 17.1
Rural Ref. Ctrs.	1.1128	1.1571	1.1813	1.2088	1.2449	1.2740	+ 8.6	+ 3.0	+ 2.3	+ 14.5
Sole Community	1.0579	1.0868	1.1065	1.1301	1.1583	1.1805	+ 6.8	+ 2.5	+ 1.9	+ 11.6

* Discharges from PPS exempt facilities and special units and all discharges in Maryland or New Jersey are excluded. All discharges in Massachusetts and New York for FY84 and FY85 are excluded.

NOTE: Data in this table are directly calculated from MEDPAR file data based on bills processed by HCFA through September 1990. Data for FY88 and FY89 are preliminary and subject to revision. FY84 CMI data have been adjusted to be comparable to CMI data for FY 85-87. This adjustment (see Federal Register, V. 49, No. 170, August 31,1984, p. 34771) reflects the FY85 reduction in DRG relative weights of 1.05% to meet the TEFRA budget neutrality requirement.

Source: Health Care Financing Administration, Bureau of Data Management and Strategy.

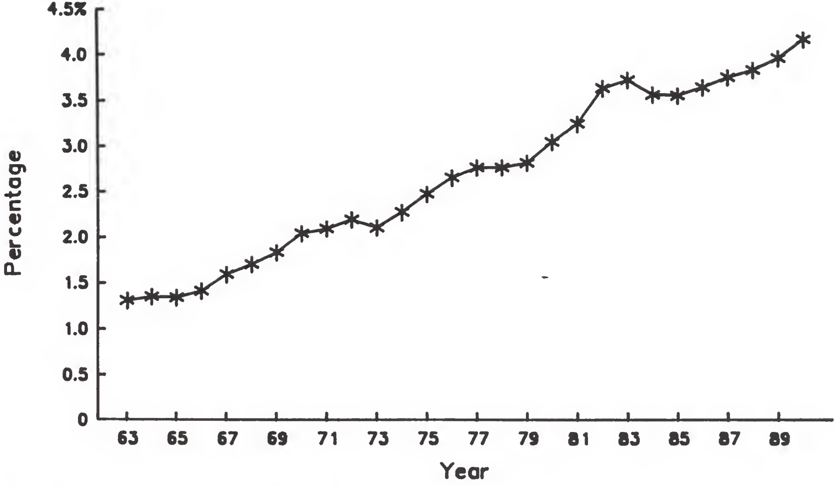
Table 3.7

Distribution of Medicare Margins by Percentile Group and Percent with Margins Greater than Zero

Percentile Distribution	PPS-1	PPS-2	PPS-3	PPS-4	PPS-5	PPS-6
10th percentile	-5.1	-6.6	-14.1	-17.6	-25.1	-29.6
25th percentile	3.9	2.5	-2.7	-6.2	-10.4	-15.1
50th percentile	11.3	10.8	6.1	3.7	0.7	-3.0
75th percentile	17.7	17.8	13.7	12.0	10.5	7.4
90th percentile	22.8	24.0	20.2	19.2	19.4	16.8
Percent with positive margins	83.1	80.9	68.5	60.5	52.0	43.1
Total number of hospitals	4,527	4,830	5,057	5,030	5,053	4,907

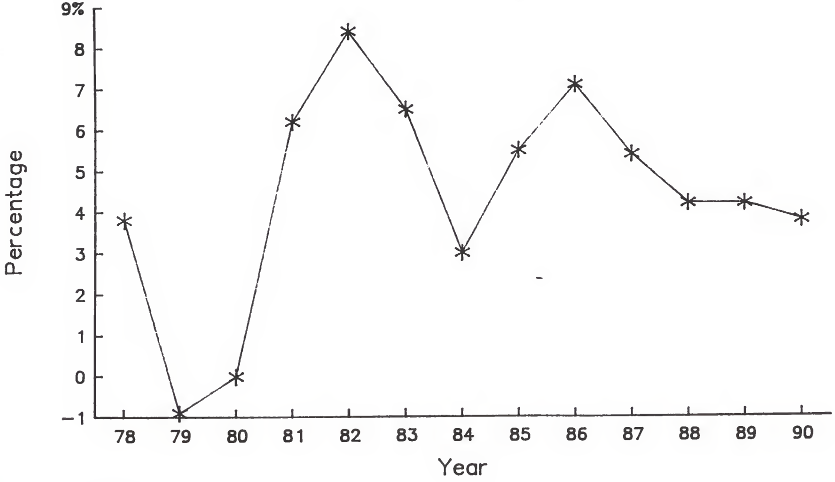
Source: Medicare Cost Reports, Bureau of Data Management and Strategy, HCFA. Data development by Office of Research, HCFA.

Figure 3-1
Percentage Of GNP By Hospital Revenues
1963 - 1990



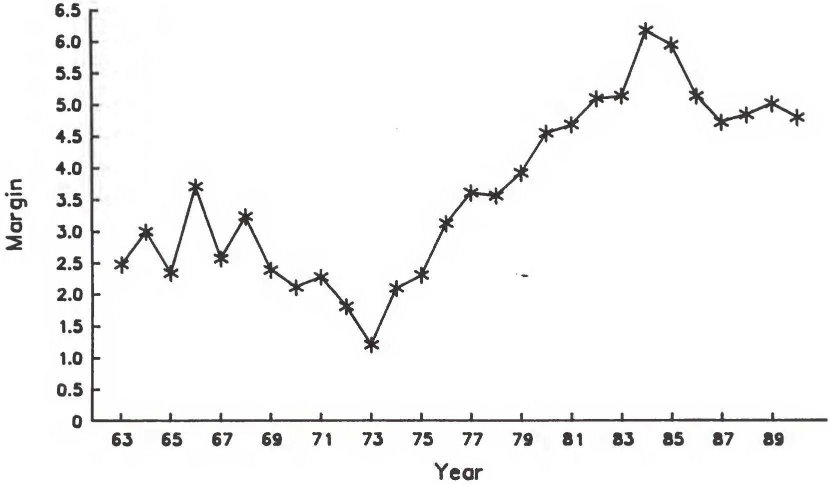
SOURCE: AHA National Hospital Panel Survey and
U. S. Council Of Economic Advisers.

Figure 3–1A
Difference Between Hospital Inflation
And General Inflation
1978 – 1990



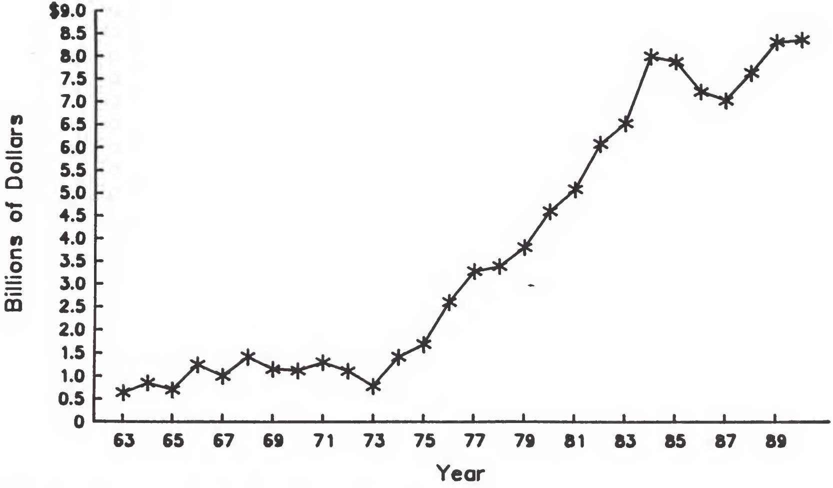
SOURCE: AHA National Hospital Panel Survey And
U. S. Coucil Of Economic Advisers

Figure 3-2
Total Hospital Margins by Year
1963 - 1990



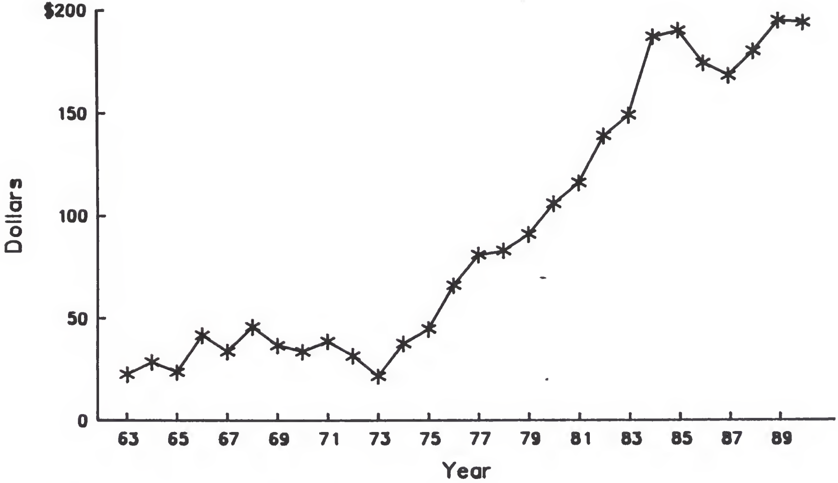
SOURCE: AHA National Hospital Panel Survey.

Figure 3-3
Real Profits For Hospitals in Billions of 1982 - 1984 Dollars (1963 - 1990)



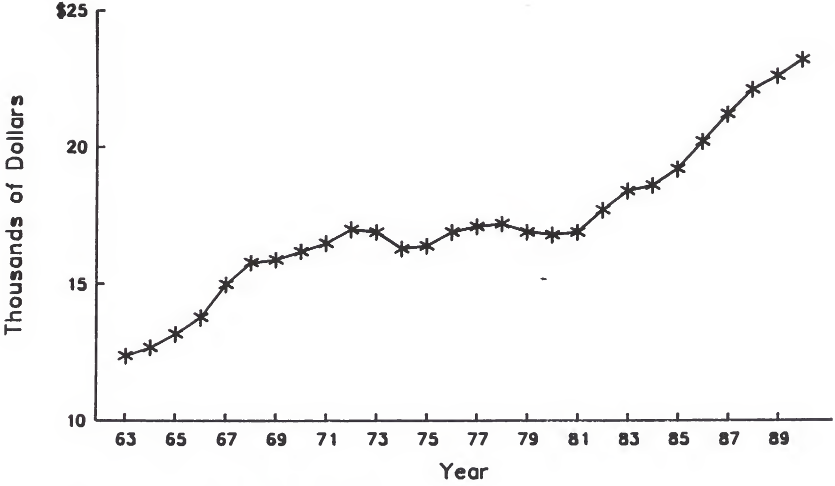
SOURCE: AHA National Hospital Panel Survey and U. S. Council Of Economic Advisers.

Figure 3-4
Real Profits Per Admission in
1982 - 1984 Dollars (1963 - 1990)



SOURCE: AHA National Hospital Panel Survey and
U. S. Council Of Economic Advisers.

Figure 3-5
Real Earnings Per Year Per FTE For Hospital Workers in 1982 - 1984 Dollars (1963 - 1990)



SOURCE: AHA National Hospital Panel Survey and U. S. Council Of Economic Advisers.

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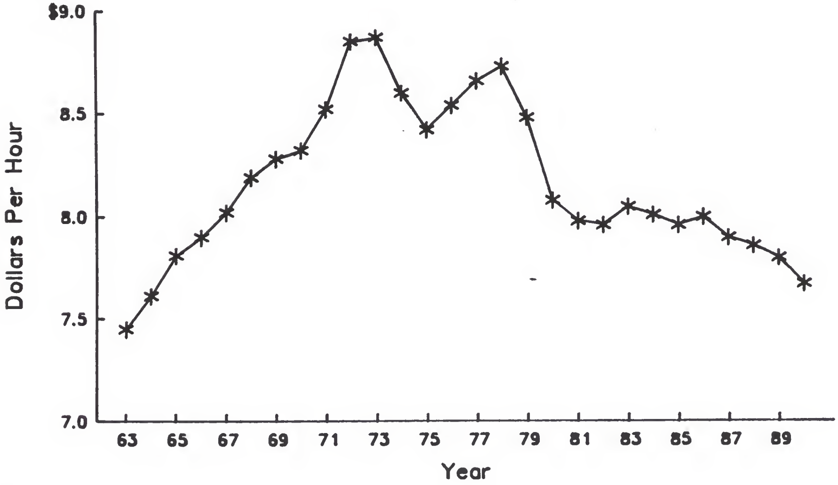
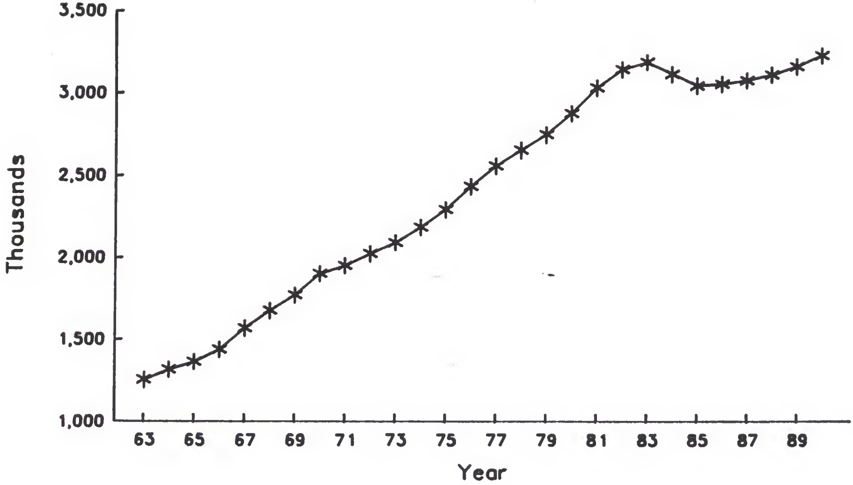


SOURCE: U. S. Council of Economic Advisers.

Figure 3-7
Full Time Equivalant Employees in Acute Care Hospitals 1963 - 1990



SOURCE: AHA National Hospital Panel Survey.

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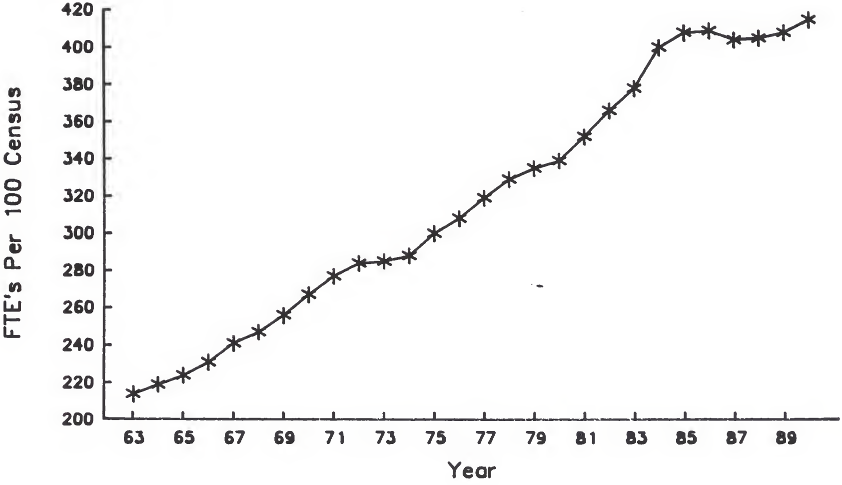

SOURCE: AHA National Hospital Panel Survey.

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APPENDIX A

PUBLISHED RESEARCH ON THE EFFECTS OF PPS: A CRITICAL APPRAISAL

Abt

Associates Inc.

Published Research on the Effects of PPS: A Critical Appraisal

November 21, 1991

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INTRODUCTION

The implementation of the prospective payment system (PPS) has produced major changes in the hospital industry and in the way hospital services are used by physicians and their patients. In its wake, PPS also brought hundreds of researchers and policy analysts writing about the consequences of PPS and commenting on the principles of health care policy embedded in PPS. Our purpose in this paper is to review this large body of work as it contributes to our understanding of:

- the effectiveness of programs of administered pricing in controlling spending and maintaining equity across the hospital industry;
- the relative importance of payment stringency, payment incentives, and the regulation of admissions in the pattern of effects seen to date;
- the extent to which the payment controls have been met by improved operational efficiency--or if not, whether hospital finances or patient care have been compromised.

As a policy for hospital cost containment, PPS represents a bundle of rate setting principles that are fairly well understood, but are certainly not universally admired. The components include administered prices rather than market forces; national base rates rather than hospital-specific rates (i.e., a policy of equalizing rates rather than equalizing pressure); and a per case payment unit rather than payment per day, per service, and per procedure.

When PPS was implemented there were strongly held expectations among promoters and skeptics. Promoters of the policy hoped that payment reductions would be matched by lower levels of spending through reduced lengths of stay (LOS), reduced intensity of care, and more efficient hospital operations. Promoters presumed this could occur without financial collapse or compromises in patient care, as large volumes of "slack" were used up (e.g., as unproductive resources were reallocated, unnecessary ancillaries and days were eliminated, and so on). So long as hospitals had been reimbursed their costs, they faced few incentives to provide efficient care. PPS gave hospitals new incentives to operate economically.

But there were also skeptics. If hospitals faced new incentives for efficiency, there were serious questions as to whether they faced just the right incentives. An additional test or day of hospital care was costly under PPS, whether medically justified or not, and the narrow financial incentive was the same in either case to eliminate the added cost. While hospitals would not necessarily strike the wrong balance between patient well-being and their income statements, there was nothing intrinsic to the PPS structure to guarantee that the right balance would be struck.[1]

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[1]Assuming we could know what the right balance was. Among other things, there is a striking absence of information about what medical services produce what outcomes, for surprisingly large array of practices (Russell, 1989; Lohr, Yordy, and Thier, 1988). If we do not know the point at which additional expenditures bring no further benefits, then we cannot know when cost controls will begin to threaten patient well-being or harm the

While PPS assumed that hospitals and physicians practiced inefficiently, it also assumed that hospitals and physicians would successfully mediate between conflicting pressures to enhance patient well-being and to contain costs. However, there were necessarily fears that the changes in practice patterns induced by PPS would be harmful: that changes in practice patterns would harm patients or--to the extent hospitals resisted purely financial incentives and maintained quality care--that hospitals would suffer financially. Without preexisting slack, PPS might well force a choice between survival of the institution and the quality of patient care. Indeed, this choice is at the core of any system of incentive payment for (mainly nonprofit) hospitals: the "carrot" of being able to keep surpluses, and the big "stick" of failing to survive.

This issue of tradeoffs was of most concern to those worried about the phase-in to national rates. National rates would create a large number of loser hospitals--hospitals with high costs relative to the payment rates. If insufficient slack were available to these hospitals, they might either fail (which could reduce access) or cause the quality of patient care to suffer.

The literature is as large and diffuse as we had anticipated in an earlier paper (Gaumer, Glazier, and Cowen, 1987). Most of it is descriptive of trends, and most of it utilizes the same common national data sources (e.g., Medicare cost reports, American Hospital Association (AHA) annual survey data, Commission on Professional and Hospital Activities (CPHA) discharge abstracts, and Medicare Provider Analysis and Review Files (MEDPAR)). Only small portions of the literature use research approaches other than pre/post comparisons, or test hypotheses about particular population groups or hospital types. In this review, we examine the published literature, with occasional reference to unpublished material with which we are familiar.

The literature is more impressive for its size than its value in understanding how PPS worked and the patterns of its effects. There are a number of reasons why our understandings about PPS and its effectiveness as a cost containment device are not resolved. These caveats are common in the literature we review and need to be restated. The most important qualification of the literature stems from the fact that PPS was implemented as a national program rather than an experiment or a demonstration. Unlike the prior research on prospective payment, which dealt with the impacts of state hospital rate-setting programs, PPS implementation offered analytical leverage only through pre/post comparisons, and comparisons with four waivered states (Maryland, Massachusetts, New Jersey, and New York). The pre/post comparisons that pervade the literature we review offer substantial threats of temporal confounding to factors that include, among others: 1) the widespread adoption of surgical and other invasive technologies that tend to favor outpatient care; 2) the widespread implementation of managed care programs in the private sector; and 3) the liberalization of home care, nursing home, and hospice benefits for Medicare in the early 1980s. The number of years available for study has also been limited, largely due to delays in the availability of the most popular forms of administrative records. As we begin the ninth year of PPS, the bulk of the published literature on PPS effects is based on no more than the first three or four years of PPS experience. This short history limits our ability to observe the consequences of behavioral change among administrators, beneficiaries and physicians. In particular, we would like to understand how persistent controls on payment affect

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quality of patient care. It is thus difficult to know precisely what changes in practice patterns should be, and in turn what structure of incentives a reimbursement system should establish for health care providers.

the pattern of spending, clinical practice, and management we observed in state rate-setting programs (Coelen, Mennemeyer, and Kidder, 1986). But given the short period of time covered by most of the PPS literature, the one time, initial effects of implementing PPS are more readily observable in this literature than are the consequences of persisting stringency in payment rates.

A final and not insignificant caveat in this literature stems from the levels of the initial payment rates. Widely conceded "overpayment" in the first year of PPS created a situation where margins were increasing as expenses per case were dropping, due to large reductions in lengths of stay. This not only made the first year a somewhat aberrant intervention, but armed most hospitals with an unanticipated source of disposable funds and probably altered expectations as well. Consequently, the first year windfall may itself be an "intervention" that generated a stream of effects that are confounded with the incentives of PPS. While the effects of the "windfall" certainly diminished over time, the years that are studied in most of the research we review are subject to the effects of the windfall and the transitory use of very restrictive updates in the next few years.

To review this research, we have divided our discussion into five substantive areas. The paper begins in Chapter I with a discussion of the financial effects of PPS on hospitals, a discussion that focuses primarily on the mechanisms by which changes in expenditures and financial conditions occurred. Chapter II then examines the substantial literature on the effects of PPS on practice patterns. Chapter III discusses the financial impacts of PPS on the Medicare program and Medicare beneficiaries, while Chapter IV discusses various potential PPS effects on the health care industry, including effects on other payers, the diffusion of new technologies, and other concerns. Chapter V reviews the literature on the effects of PPS on the quality of patient care. In Chapter VI, we offer a series of conclusions about the effectiveness of PPS as a hospital cost containment policy for Medicare and suggest useful priorities for future research in this area.

CHAPTER I.

HOSPITAL FINANCE

The central objectives of PPS were to reduce rates of increase in Medicare inpatient payments and in overall hospital cost inflation. These aims were expected to be achieved through a combination of three key elements of the PPS program:

1. By the marginal incentives of a per case rate-to-rate payment system, that put hospitals at financial risk for inefficiency and unnecessary intensity--and allowed hospitals to retain the gains from lower costs and more efficient operations.

2. By the financial stringency for higher-cost hospitals of a program that controlled rates of increase in payment amounts, and that gradually shifted hospitals from their own cost history to national rates.

3. By regulatory controls on admission rates by Peer Review Organizations (PROs).

The foundation for this policy package was a decade of incentive rate setting in the states. (See Coelen, Mennemeyer, and Kidder, 1986; and Schramm, Renn, et al., 1987.) That experience showed that a wide range of approaches to binding revenue control were able to slow inflation rates in hospital expenses by 2-4 percentage points per year; that these effects were due to persistent controls on inflation rates, not just one-time effects; that the per case unit of payment creates strong volume effects, which made the net effects of rate setting smaller would have occurred if volumes had been controlled; that excluded payers shared in the financial benefits of administrative rate setting, but to a lesser degree than the payers for which the rates were binding; that hospital and other administrators were unable (or unwilling) to reduce rates of increase in expenses by as much as rates of increase in revenues (payments) had been reduced, thereby causing reduced margins; and (according to some evidence) that rate setting may have had small adverse effects on patient outcomes (Shortell and Hughes, 1988; and Gaumer, Poggio, et al., 1989). With several exceptions, this pattern of effects is similar to what we find in the literature on PPS. Indeed, in many ways the PPS literature confirms what was already known about hospital incentive reimbursement as a cost containment policy. We will return to this point later.

For convenience, Table 1 below summarizes the basic findings of the literature concerning the effects of PPS on hospital finances. That literature is in general agreement on a few central descriptive results--specifically, that there were:

- initial (PPS1) windfalls due to higher-than-planned PPS payments.

- modest annual increases in payments after PPS1, caused by small updates and increases in the Case Mix Index (CMI).

TABLE 1.

SUMMARY OF THE EFFECTS OF PPS: HOSPITAL FINANCES

AREA OF EFFECT	PRINCIPAL FINDING	SECONDARY FINDINGS	IMPORTANT INDUSTRY DIFFERENCES
•PPS Margins	Initial windfall increases (PPS 1,2) followed by reductions to PPS 6 where over half of hospitals have negative PPS operating margins; only large urban teaching hospitals are positive as a class.	Volumes, higher case mix, large, urban, teaching, and low base costs are key to high Medicare margins.	Margins not declining for winners. Losers margins are deteriorating.
•Total Margins	Falling, but flattening after PPS 3, with general rise in margins for all business except Medicare inpatient.	Small hospitals have low non-Medicare margins and cross subsidize from Medicare.	Margins less likely to fall for less pressured hospitals, who do less to control costs.
•Other Financial Indicators	General decline in industry liquidity and increase in indebtedness.	Increase in assets per bed.	
•Closures	Closure rates not influenced by PPS payment rate pressure.		Small hospitals most vulnerable. Closure rates comparable in urban and rural areas.
•Hospital Expenditures	Reductions in the rate of increase are substantial and not restricted to the first year, or simply to the effects of admission declines, or to Medicare alone.	Cost containment was muted by windfall payments (profits) in PPS 1, 2, and by failing to equalize pressure (national rates).	Cost containment most pronounced for highly pressured hospitals.
•Sources of Hospital Efficiency and Productivity	Improved efficiency early due to decreases in intensity, LOS, wage cost increases and higher productivity.	Efficiency reversal after PPS 2 due to increases in intensity and non-labor costs that are larger than gains in labor productivity. Early excess profits may also promote subsequent spending growth.	Improvements greatest in pressured hospitals.

Source: Coulam and Gaumer (1991).

- initial large cost reductions in PPS1 due to cuts in length of stay, followed by a return to nearly double-digit inflation thereafter.

- high initial profits on Medicare cases declined over time, as Medicare costs inflated faster than Medicare payments.

- steady hospital profits in PPS4 and after, even as PPS profits have continued to fall.

- higher rates of closures and mergers in the years following the introduction of PPS.

The most important issues in the literature on hospital finances under PPS concern the causes and implications of this agreed pattern of basic results.

A. Expenditures in Hospitals

Russell (1989) notes that Part A Trust Fund payments have been growing at a slower rate since the start of PPS, with savings cumulating to around 20% by 1990 (or a saving of a bit under 3 percentage points on the rate of increase).[2] But for PPS to be successful in the longer run, not only must Medicare payments be reduced, but inflation in hospital expenses must be slowed. All but one early study suggests that expenses inflated at a slower rate under PPS. (The exception is Sloan, Morrisey, and Valvona (1988b), which finds that volume reductions explain all reductions in expenses, with no net efficiency effects.) Studies of expenditures in hospitals during the first year or two of PPS found significant reductions in cost per admission for hospitals that were pressured,[3,4] and for the aggregate of all hospitals under PPS.[5] The measured effects in these studies are quite large, though consistent with the initial, large reductions in LOS. Adding to the apparent validity of these large, initial effects is the fact that the three Urban Institute and Georgetown studies use entirely unique data sets and methods, but still yield consistent findings for the first year of PPS. The large declines in admission volumes appear to have contributed,

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[2]Evidence from Coelen (1991) described later shows that this revenue effect has largely been exacted from high cost hospitals.

[3]Robinson and Luft (1988) use percent Medicare payer mix to define a "high" pressure group that had spending increases 16% lower than the "low" pressure group.

[4]Feder, Hadley and Zuckerman (1987) and Hadley, Zuckerman and Feder (1989) show that the hospitals expected to lose the most through the phase-in to national rates have lower rates of increase in expense per case and slower declines in admissions.

[5]Hadley and Swartz (1989) and Feder, Hadley and Zuckerman (1987) find estimates of expenses 12-13 percent lower due to PPS in the first year alone.

but in a minor way, to total expenditure reductions, making the expenditure reductions somewhat larger than the efficiency gains alone.[6]

Most of the research on expenditures is consistent as to sources of the effect, but most are able to observe only the first year or two of PPS: a period when sharp LOS drops occurred and little financial pressure was applied. During the first three years of PPS, inflation in hospital expenses per adjusted discharge (and Medicare operating expenses per discharge) were reduced about 5-7 percentage points from pre-PPS, double-digit levels. (Prospective Payment Assessment Commission (ProPAC), 1991, p. 51; Cromwell and Puskin, 1989, p. 372).[7] Cromwell and Puskin (1989) attribute this decline to:

- a slowdown in the rate of increase in wages per hour (75% of the decline);
- a slowdown in intensity growth including LOS (9%); and
- improved productivity in producing hospital services (16%).

Trend data in Table 2 indicate that rates of increase in staffing and compensation declined early in PPS, then eventually rose. ProPAC data (1991, p. 66) show a similar pattern: a substantial slowdown in the rate of increase in salary and in benefit expenses (per Full Time Equivalent, or FTE). This slowdown began with limits established by the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA) and continued through 1987 at modest levels, with the levels rising again thereafter. Sloan, Morrisey, and Valvona (1988b) also find a significant PPS efficiency effect on labor costs per case for the first two years of PPS.

A study by Hadley, Zuckerman, and Feder (1989) demonstrates that the expenditure reductions and other outcomes are moderated in the second year. The authors interpret this to mean that incentive effects were "one time" only, while pressure was required to achieve continuing savings. The trend data support the view that the magnitude of savings has been dissipating over time, even if effects are somewhat more extended than "one time" only. The trends in expenditures (see Table 2) suggest that inflation in PPS expense per case has remained at 9-11% per year from PPS1 through PPS6 (well above the market basket inflation rate); by contrast, over the same period, the initially reduced rate of inflation in overall hospital expenditures has not been sustained.

There is some evidence that clinical and general productivity in hospitals improved under PPS and may still be improving. Using AHA survey data Cromwell and Pope (1989) note that

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[6]Looking at Part A payments, Russell (1989) estimates that one third (1 percentage point) of the 1984-1990 reduction is due to admissions declines. Hadley and Swartz (1989) estimate that the reduction in inflation rates is 1.5 percentage points larger due to admissions declines.

[7]These sources use different data. ProPAC (1991) uses Medicare cost reports, while Cromwell and Puskin (1989) use AHA/HAS (Hospital Administration Studies) Monitrend panel survey data.

TABLE 2.

RATES OF INCREASE IN HOSPITAL EXPENSES
(Percent)

COST ELEMENT	TEFRA-PPS1	PPS1-PPS2	PPS2-PPS3	PPS3-PPS4	PPS4-PPS5	PPS5-PPS6
PPS Operating Expenses	-4.6%	4.2%	5.7%	7.4%	11.8%	10.8%
PPS Operating Expenses per Discharge	1.9	10.4	9.7	9.0	10.6	9.7
Market Basket	4.9	3.4	3.1	3.6	4.8	5.4
FTEs	-2.5	-0.8	1.0	2.7	2.8	3.0
Compensation per FTE	7.2	4.4	3.2	3.7	7.1	6.5
CMI	2.4	3.1	2.0	1.8	6.1	2.7
CMI-Adjusted Intensity	-2.6	-2.2	2.4	2.5	1.6	0.8

Source: ProPAC Reports to Congress (1990, 1991).

total factor productivity and labor productivity in hospitals improved in the TEFRA-PPS2 period. Depending on output measure (days, cases, charges), the improvements post TEFRA represent absolute improvements in productivity (if charges are used), or a slowdown in the rate of productivity decline. Using entirely different data and productivity measures based on casemix-adjusted episode outcomes (from the Professional Activity Study (PAS) of the CPHA), Long, Chesney, et al. (1987) confirm a clinical productivity improvement. For 49 Diagnosis-Related Groups (DRGs), they demonstrate a substantial reduction in inputs per unit output in the first year of PPS. (Pharmaceutical usage is the exception.) They also note that the output measure--the episodes of care considered completed--was <u>lower</u> post PPS; but the reduction in inputs was even larger, causing an overall improvement in clinical productivity.

ProPAC (1991) notes that the rate of increase in intermediate productivity (services per FTE) has been rising slowly since PPS3. This pattern, and the patterns on Table 2, seem to suggest a sharp initial increase in efficiency due to a reduction in growth rates of intensity (length of stay) and in salary/benefits, followed by continuing restraints on labor costs and improved labor productivity. The return to higher rates of inflation seems to be a result of higher rates of fringe and salary increases and a sharp increase in the pace of both the CMI and CMI-adjusted intensity after 1985.

B. <u>Margins</u>

Profit margins are important measures of hospital financial condition. The combined effects of very modest annual update factors and the complete phase-in to national rates by PPS5 have led to a situation where a majority (57%) of hospitals earned negative margins on Medicare inpatients by PPS6. During this period total hospital margins have fallen and stabilized at levels that are similar to those in 1980, which were higher than margins during the 1970s. (For a discussion of this trend, see Russell, 1989, p. 78.)

While many analysts look to variously defined profit trends as "gold standard" evidence of the sufficiency of payment rates, there are many reasons to doubt the importance of such measures. First, research certainly does not directly support a view about levels of margins (PPS or facility) as being too high or too low, because it is not possible to say whether hospitals are operating at maximum efficiency, or if PPS payment levels reflect that "most efficient" level (Russell, 1989). Second, unlike margins in profit-oriented industries, margins for hospitals are largely means, not ends. Their level may not reflect anything about an institution's welfare in a given period, its success in operations, its ability to attract funds from external sources, or the security of top managers in their positions. Finally, the massive reorganizations and product mix changes occurring in the industry in recent years would likely alter the necessary rate of return for these organizations, by comparison to the hospital industry of the 1970s or early 1980s. We would expect overall margins to settle at a somewhat higher level in the industry under PPS than under cost reimbursement, because hospitals are assuming more business and financial risk.

There is interesting and important new evidence that the distributions of margins are <u>diverging</u> across the industry, stemming from differential PPS payments and a failure of

expenditures to realign across hospitals so that margins are the same. Recent work by both ProPAC (1991) and Cromwell and Burge (1991) demonstrate a lack of year-to-year profit convergence. Suggestive data are shown in Table 3. Essentially, the "winners" (hospitals with consistent high margins) did not experience the declines in margins of the typical hospital, and the "losers" experienced continued declines.

The bifurcation of PPS margins may be a telling fact about the cost-containment success of PPS. As Coelen's (1991) graphic analysis indicates (see Figure 1), the hospitals entering PPS with the highest base year costs per case[8] reduced costs more than the lowest-cost hospitals and experienced virtually no increase in PPS revenues per case through the phase-in period. This suggests that updates that fail to consider financial results may generate extreme windfalls and inequities. The more rigorous econometric work on the early years of PPS by other researchers from Urban Institute and Georgetown first pointed to the fact that hospitals pressured by payment rates under PPS (e.g., high-cost hospitals) exhibited more aggressive responses to improve financial performance, in terms of cutting LOS, reducing rates of inflation in expenditures, and avoiding larger reductions in admission volumes. (See Feder, Hadley, and Zuckerman, 1987; Hadley and Swartz, 1989; and Hadley, Zuckerman, and Feder, 1989.) Examining the first two years of PPS, these researchers also found that these differences in response, coupled with the regional rate blend, led to significant differences in margin trends between "pressured" and "not pressured" hospitals. Changes in profit margins were favoring the latter group of facilities, <u>who were taking less aggressive actions to improve financial performance</u>. This pattern of evidence suggests that:

- pressure matters, and
- profits accrue as windfalls on past cost levels, or to other facility and market characteristics.

The pattern has been widely confirmed in every study that has studied differential hospital performance due to differential pressure.[9] Across these various "pressure" indicators and studies using varied data sets[10] there is a consistent pattern of findings.

[8]Coelen uses a threshold of twenty percentage points above the mean to define the high-cost group; the low-cost group has a threshold 20 percentage points below the mean.

[9]Studies of <u>actual</u> winners/losers have been done (Coelen, 1991; ProPAC, 1991), as have studies of <u>expected</u> winners/losers (Cromwell and Burge, 1991; Feder, Hadley, and Zuckerman, 1987; Hadley, Zuckerman, and Feder, 1989; Hadley and Swartz, 1989; and Zwanziger and Melnick, 1988). Other studies of pressure examine hospitals where <u>Medicare payer shares</u> are greatest/least (Robinson and Luft, 1988).

[10]The data designs include: AHA annual survey data on individual hospitals (Hadley, Zuckerman, and Feder, 1989; Robinson and Luft, 1988); Standard Metropolitan Statistical Area (SMSA) aggregates of AHA data (Hadley and Swartz, 1989); Special Survey of Hospitals (Feder, Hadley, and Zuckerman, 1987); California Financial and Discharge data sets (Zwanziger and Melnick, 1988); and Medicare Cost Reports, combined with AHA data at the hospital level (Coelen, 1991; Cromwell and Burge, 1991; and ProPAC, 1991).

Table 3.

Margins in Chronically High and Low Margin Hospitals

Characteristic of Hospital	Average PPS Margin, By Year		
	PPS3	PPS4	PPS5
Urban Hospitals			
Chronically Low Margin*	-9.4%	-15.9%	-24.1%
Middle Margin	8.6	5.2	0.3
Chronically High Margin**	22.0	20.9	19.2
Rural Hospitals			
Chronically Low Margin*	-23.4%	-28.6%	-33.4%
Middle Margin	0.8	-1.1	-2.6
Chronically High Margin**	18.1	17.9	17.6

Source: ProPAC (1991), Tables 2-13, 2-14.

* Lowest quartile of margins in each of PPS3, 4, and 5.
** Highest quartile of margins in each of PPS3, 4, and 5.

These findings and their implications have become something of a literature themselves (see sources cited above, plus Lave, 1990; Oday and Dobson, 1990; and Guterman, Altman, and Young, 1990). Can we say that only (or mainly) through pressure--rather than managerial incentives to accrue profit--do administered prices work to reduce hospital cost inflation? The work by Hadley, Zuckerman, and Feder (1989) makes the strongest case for this view. They find large initial effects, followed by diminished effects in the next year. They conclude that these early effects are apparently the result of a large (one time) fall in LOS, creating a large spending effect beyond the effects of TEFRA.[11] They also show that hospitals responded to changes in levels of pressure, whether they occurred in the first or second year on PPS, and regardless of the level of prior year pressure. They conclude (p. 362) that "the initial, rather than the continuing, opportunity for profit has the bigger impact" and go on to say that "the slowdown in cost containment--or resurgence in cost increases--after hospitals' initial year on PPS raises questions about the system's long-term effectiveness."

This is strong evidence favoring a general "pressure matters" thesis. However, we cannot conclude that, if pressure had been placed on otherwise "unpressured" hospitals (e.g., low-cost hospitals), there could have been substantially more savings in hospital spending. It is true that Medicare outlays would certainly have been lower in these hospitals if equal pressure had been applied. But there is no evidence that unpressured, low-cost facilities could (or would) cut the rate of expenditure inflation if pressured. There is also no evidence that such facilities do not have as much inefficiency (slack) as others. If pressure had been equalized, would there have been as much "pressure" on the high-cost hospitals? If not, this literature certainly suggests that not as much would have been saved from these hospitals. Hence, equalization of pressure through some form of hospital-based rate (rather than a national blend) may allow more cost containment, or it may not.

Can we say why high rates of inflation returned? These authors offer two explanations for the resurgence in spending: first, that maximum efficiency had been attained; and second, that the original profit windfall was being expended in subsequent years. There is some evidence, albeit indirect, to support both explanations. There is some research to suggest that payment pressure may be able to generate cuts in resource use that are sufficient to reduce patient welfare, possibly buttressing the view that maximum efficiency has been reached. Work by Staiger and Gaumer (1990) and Cutler (1991) suggests that patient mortality outcomes in small hospitals and government facilities may be quite sensitive to variations in payment levels. Other types of facilities do not exhibit such sensitivity. This does not imply that PPS is creating a mortality problem, but that such facilities, for whatever reasons of structure and history, are vulnerable to variations in rates. These results, and the econometric work on margins by Cromwell and Burge (1991), emphasize how strongly total margins seem to be related to size (small facilities, low margins), thereby confirming the special vulnerability of small facilities to fixed payment rates. This vulnerability may be due to the volatility of volumes within small pools of patients, or to the low occupancy rates or limited revenue recovery alternatives these smaller institutions enjoy. At the same time, however, there is no evidence that other classes of institutions have exhausted

[11]The expenditure effects of the TEFRA program incentives have been estimated to be about half as large as the first-year PPS effects (Hadley and Swartz, 1989).

slack, nor is there evidence that rate variations for inpatient care can cause the appearance of exhausted slack.

There is some emerging evidence that excess payments may have fueled some of the early spending increases. This evidence also suggests limits to the marginal incentives to retain profits. But it really does not dismiss the role of marginal incentives in limiting losses. The Urban Institute and Georgetown authors, as well as Cromwell and Burge (1991), estimate models showing that profit levels are related to subsequent spending and margins, lending support to the view that the return of high inflation may have been caused by the national rate phase-in, as excess profits may have caused subsequent spending. That is, with a national rate phase-in, PPS may have had its own built-in self limiting mechanism. Clearly, much of the "windfall" early in PPS resulted from overpayment, not rate-equalization. Moreover, the initial return of higher rates of spending growth might well have been exacerbated by a pool of windfall profits.[12] The work by Hadley, Zuckerman, and Feder (1989) suggests that a $0.30 of every $1 in excess profits will be spent in the subsequent year. This is roughly the order of magnitude of year-to-year profit retention as would be indicated by the Cromwell and Burge (1991) margin model. Unfortunately, this line of research does not allow any confirmation of growing fund balances that might compete for profit with operating budgets.

There seems to be little doubt that savings from unpressured (low-cost) hospitals could have been larger had rate pressures been greater. But could this practically be done, without reducing pressure on high-cost hospitals where most PPS savings occurred? Many would argue that rates be set on a hospital-specific base to accomplish this end. What is needed is a way of having payments differences better reflect efficiency differences--otherwise, hospital-based rates propagate inefficiencies ("inefficient" hospitals receive relatively higher rates). One way to do so is to inspect and test base costs against reasonableness standards, as is common in some state rate-setting systems. This is likely to be too burdensome a process for Medicare, unless formula-generated limits are devised against which to test aggregate or line item costs. The development of such formulae would be difficult; but if a formula could be written, its parameters could be used to adjust national payment rates directly. Work by Gianfrancesco (1990) suggests the nature of the bias in the current set of PPS adjusters, and extensions of such work using expenditure models could be used to develop a more refined payment rate or to develop limit tests if hospital-specific payment rates are used.

The literature also provides evidence that poses an important issue about any conversion to a system that might equalize rate pressure through hospital specific rates. The substantial evidence of differential changes in LOS, capacity utilization, and expenditures may be evidence that existing variations in efficiency (slack) are wide. While hospital-based rates (and equalized pressure) might well have been a preferred cost containment approach after a decade of cost reimbursement, it does seem that a transition at this time (in the face of such strong evidence of differential behavior of winners and losers) poses severe equity problems for the transition,

[12]Interestingly, there is no apparent difference in the spending rates of investor-owned and non-profit institutions in response to PPS1 windfall profits (Friedman and Shortell, 1988). We would expect higher retention rates (and lower spending rates) in investor-owned hospitals.

locking in whatever current slack differentials have resulted since 1984, as indicated by the evidence developed by those researchers favoring a transition to hospital-specific rates.

Our final comment about the cost containment potential of PPS concerns inpatient volumes. At the time PPS was implemented, volume control was seen by many policy analysts to be the problem of cost containment. However, unlike state rate-setting programs (Coelen, Mennemeyer, and Kidder, 1986), PPS effects due to incentives and pressure were probably augmented, rather than blunted, by volume changes. The per-case incentives worked to reduce hospital use, and the fall in admissions during the first few years of PPS (possibly due to PRO regulations) helped considerably. Whatever the relative effects of incentives and pressure on efficiency, it seems clear that the volumes policy embedded in the incentives and regulations of PPS did not detract from reimbursement controls on hospital spending. It is also clear that volumes of Medicare admissions have fallen more slowly than non-Medicare admissions, possibly suggesting that the PPS incentive to increase admissions was, indeed, at work. ProPAC reports (1991, p.90) that between 1979 and 1990 per capita admission rates for persons under 65 decreased rather continuously from 134 per 1000 to 78 per 1000, a decline of about 26 percent. Over this period, the over-65 population had admission rates peak at 431 per 1000 in 1983, then fall by 16 percent in the next three years, stabilizing thereafter at a rate of about 360 per 1000. This pattern suggests PRO regulations accompanying PPS may have helped reduce social and other unnecessary admissions at the onset of PPS, but that Medicare admissions are increasing relative to other populations due to the strong PPS reimbursement incentives. Unfortunately, the literature we examine below is inconclusive on this important point.

C. Closures

Closure rates represent a blunt, external measure of financial health in hospitals--a measure that is politically provocative as well. Closure rates have certainly been higher since PPS was implemented. As the General Accounting Office (GAO, 1991b) notes, the number of closures in the four years after PPS was double the number in the four years prior to PPS. About half of all closures in the 1980s were of rural hospitals, and 85% of all closures were for hospitals with fewer than 100 beds.

Multivariate models in two recent studies enumerate factors that predict closure. While the models they use are different in many respects, both the GAO (1991b) and Adamache and Hurdle (1991) concur that higher closure rates are associated with:

- declining volumes (days or occupancy);
- declining population or high unemployment;
- more competition;
- small number of beds;
- more debt (Adamache and Hurdle only);

- less severe casemix; and

- status as an independent proprietary hospital.

Case studies done by both groups also suggest that one part of the rural closure problem concerns physician availability. The loss of a physician creates volume and occupancy problems in small rural hospitals, which in turn reduces profits and raises the threat of closure.

ProPAC (1991) concurs that competition from urban hospitals and volume and population problems were central to closures in rural places. ProPAC also notes that volumes of births, outpatient activity (surgical and medical), and the availability of high technology services were lower in sole-county hospitals that closed than in other sole-county hospitals that did not close.

All serious studies conclude that PPS payment levels have not been an important cause for closure. PPS payment levels were higher for closing than non-closing hospitals (Adamache and Hurdle, 1991) and higher for Medicare than for non-Medicare cases in the closing hospitals (GAO, 1991b, p. 34). Additionally, the GAO concludes that Medicare-dependent facilities[13] do not have higher closure rates; and Adamache and Hurdle similarly find no relationship between closure and Medicare's share of patient days. Both studies point to declining volumes and low occupancy rates as the cause for closure, relying on non-statistical arguments. Indeed, the GAO (1991b) and ProPAC (1991) both conclude, fairly decisively, that access to inpatient care has unlikely been seriously affected, even if PPS had caused the demise.[14] "It does not appear, therefore, that access to inpatient hospital care has been impeded by rural hospital closures, even in counties where the only hospital closed" (ProPAC, 1991, p. 125).

These studies do not rule out the possibility that PPS did affect closure rates.[15] Rural admission rates have traditionally been quite high; and post-1983 rates were substantially higher among small hospitals and rural populations than urban ones (Gaumer, 1989; ProPAC, 1991). This set of facts may be less related to the reimbursement effects of PPS, and more related to the regulatory aspects (PRO's), and the relatively large declines in admissions is rural hospitals. Moreover, small institutions faced greater volatility in patient volumes (Gaumer, 1989), and the financial consequences of this volatility are not as well buffered by PPS as they would be by cost reimbursement. Thus, the incentives and regulatory aspects of PPS may have contributed to elevated closure rates, even if payment levels were not implicated. The literature does not confirm this possibility, but the research bearing on the levels of payment rates, updates, and Medicare shares does not rule it out.

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[13]Those hospitals at which Medicare days exceed 60% of all days.

[14]The GAO (p. 38-54) notes that, in the affected rural areas studied, only about one-third of the Medicare inpatient care base was using the facility to be closed; and only 2 of 29 communities did not have an alternate hospital within 35 miles. ProPAC bases its work on a travel-time analysis. In places where the sole hospital closed, average travel time to the alternate source was 29 minutes. In places not having a hospital, the average was similar: 26 minutes. Moreover, average distance to a hospital with more than 100 beds was not significantly different for the two groups of places.

[15]Adamache and Hurdle (1991) do demonstrate a statistically significant trend shift in closure rates starting in 1986; but they do not choose to conclude that PPS was a contributing factor.

CHAPTER II.

PRACTICE PATTERNS

A useful beginning point for understanding the effects of PPS is to ask how PPS changed the practice patterns of hospitals and other providers of health care to Medicare beneficiaries. Changes in practice patterns were not the only objectives of PPS. But expectations of favorable changes in practice patterns constituted the core justification for the PPS idea: that the incentives of prospective payments would induce hospitals to practice more cost effectively. So long as hospitals had been reimbursed their costs, they faced few incentives to provide efficient care; under fixed reimbursement per case established by PPS, what had been sources of revenue to the hospital now became sources of cost, with the hospital and its physicians placed in the position of balancing additional costs for care (e.g., additional tests or hospital days) against the fixed reimbursement.

But if hospitals faced new incentives for efficiency, there were serious questions as to whether they faced just the right incentives. There necessarily were fears that the changes in practice patterns induced by PPS would be harmful. Indeed, the controversy surrounding the implementation of PPS fastened attention on these issues. <u>If there was a score to be kept on the effects of PPS, it was in the first instance a score on how the practice patterns of hospitals and other providers changed</u>.

A large literature has developed attempting to identify what the changes in practice patterns have been and what the implications of those changes are. This section will focus on what the changes have been, leaving most of the implications (e.g., for Medicare costs, hospital finances, and quality of patient care) for other sections of this review. The principal findings are summarized in Table 4. Our discussion is organized much as the literature is: in terms of how PPS affected each of the different types of providers in the system. We begin by discussing practice patterns in the hospitals themselves, where the first-order effects of PPS were expected to be felt.

A. <u>Inpatient Practice Patterns in Non-Exempt Hospitals</u>

Studies of PPS' impact on hospital practice patterns have focused on measures of three principal dimensions of care: admissions, patient length of stay, and the intensity of care within an admission. We discuss each in turn below.

1. <u>Admissions</u>

Since PPS established fixed reimbursement amounts per hospital admission for each DRG, hospitals theoretically could enhance their revenue and margins by increasing the number of admissions for all DRGs for which reimbursement exceeded the marginal costs of care. This prospect was sufficiently serious as to elicit the single major administrative procedure that accompanied the implementation of PPS: the establishment of PROs, assigned (in the first years

TABLE 4.

SUMMARY OF THE EFFECTS OF PPS: PRACTICE PATTERNS

AREA OF EFFECT	PRINCIPAL FINDING	SECONDARY FINDINGS	IMPORTANT INDUSTRY DIFFERENCES
•Inpatient Hospital			
--Admissions	Substantial, unexpected, and still-unexplained decline until 1987, when admissions stabilized or started to increase.	Admissions declines were selective by DRG, patient condition.	Declines started earlier, proceeded at a faster rate, in rural hospitals. Declines less at hospitals under greater fiscal pressure.
--Length of Stay	Initial, sharp decline in first year or two only.	LOS declines were across the board, not selective.	Declines less at hospitals under greater fiscal pressure.
--Intensity of Care	Decline, or little change (results vary by attribute of care and by study).	Declines in intensity/admission offset (to an indeterminate extent) by increases in outpatient utilization.	
--Case Mix/Severity of Illness	Substantial increase in nominal case mix was the largest single factor in per-case payment increases under PPS.	Case mix increase due to flaws in original weights, hospital upcoding, and real severity increases. Upcoding errors tend to benefit hospitals.	Case mix indices higher for large, urban, and teaching hospitals and increased faster for them.
•Outpatient Care	Shift in physician services to outpatient setting, drop in inpatient share of surgical services.	Outpatient surgeries and other procedures increased, as did outpatient visits associated with inpatient episodes.	Increases in outpatient visits less at hospitals under greater fiscal pressure.
•Post-Hospital Care	Mixed evidence on whether SNF utilization increased. Clear evidence of increase in home health utilization.	HCFA administrative changes and Catastrophic Coverage Act had large effects. Increase in severity for patients admitted to post-hospital care.	
•Exempt Units/Facilities	Increase in admissions, suggesting some shift of admissions to exempt environment.	Many units/facilities benefit from PPS, do not seek exemption. Some surprises: e.g., larger LOS decrease for exempt than non-exempt psych. units.	Exempt units (compared to exempt hospitals) had greater percentage increase in number of: --admissions --facilities.

Source: Coulam and Gaumer (1991).

of PPS) the task of monitoring hospital utilization, particularly for inappropriate admissions. In any event, some increase in admissions was expected to accompany the new procedure, particularly admissions of less seriously ill patients (e.g., Guterman and Dobson, 1986). Any such post-PPS increases would likely exacerbate the pre-PPS trend of annual admissions increases (DesHarnais, Kobrinski, et al., 1987; and ProPAC, 1990). Indeed, prior to PPS, Medicare admissions had increased steadily, with the annual increases never falling below 3% (Guterman and Dobson, 1986).

We reviewed more than 20 different studies that measured the effect of PPS on Medicare admissions to non-exempt short-stay hospitals. While the different studies measure admissions or discharges in different ways and are based on different data and methods, all but two of the studies (Sager, Leventhal, and Easterling, 1987; and Smith and Pickard, 1986) find PPS associated with a decrease in admissions.[18] For example, DesHarnais, Chesney, and Fleming (1988b) find almost a 10% reduction in Medicare discharges in the first year of PPS (1984), as against the projected admissions level for that year based on pre-PPS (1980-1983) experience. Estimates unadjusted for pre-PPS trends typically find lower percentage declines. For example, Guterman and Dobson (1986) estimate the first-year decline in admissions to be less than 2%. Similarly, Guterman, Eggers, et al. (1988) find three straight years of absolute admissions declines under PPS (FY1984-FY1986), with admission levels declining 3%-4% per year on average over the three years, and admission rates per Medicare enrollee declining 5% per year on average over the same period.[19] Among the few studies with data after 1986, all show admissions levels to have stabilized or to have begun to increase slightly by 1987 (ProPAC, 1990; Russell, 1989; and Schwartz and Mendelson, 1991). As between medical and surgical DRGs, medical discharges began to decrease in late 1983 and continued to decrease through 1986; by contrast, surgical discharges actually increased in 1984, but then decreased in 1985 and to a lesser extent in 1986 (Fisher, 1988b).

Admissions declines are estimated to have started earlier--and to have proceeded at a faster rate--for rural, as opposed to urban, hospitals (ProPAC, 1990). Admissions declines in rural hospitals thus began before PPS, due to exogenous factors; and PPS appears to have accelerated the trend. Meanwhile, the effects of PPS by region appear to have caused some convergence in admissions rates: the rank order among the regions did not change, but there was a slight narrowing of the relative difference between the region with the highest admissions rates (the South) and the lowest (the West) between 1983 and 1985 (Latta and Helbing, 1988).

These findings on admissions contradict initial expectations that admissions would rise under PPS. Perhaps the principal finding consistent with original expectations is that admissions declines were less in hospitals that faced higher levels of "fiscal pressure" under PPS--thus suggesting that the incentive to maintain or increase admissions levels was felt more strongly by hospitals perceiving a greater need for the added revenue (Hadley, Zuckerman, and Feder, 1989).

[18] Both exceptional studies are of select subpopulations: the sample for the Sager study is institutionalized Medicaid recipients in Wisconsin, and the sample for the Smith study is 66 Philadelphia-area hospitals.

[19] Admissions rates per enrollee dropped faster than admissions levels, because the size of the Medicare population continued to grow in this period.

More generally, however, the findings on admissions were a surprise. Notwithstanding that surprise, the reasons for the decline in admissions are not well understood. The most natural inferences are:

- The PROs were effective in preventing or deterring marginal admissions. While this inference is common (see, e.g., Eggers, 1987; Russell, 1989; and Russell and Manning, 1988), there is in fact little published evidence to support it; and there are at least three reasons to be skeptical. First, PRO reviews cannot have had a direct effect on most Medicare admissions in studies of the first year of PPS. The principal reason: the initial PRO contracts became effective over a five-month period beginning in July 1984 (Office of the Inspector General, 1988), while PPS was implemented for the initial group of subject hospitals between October 1983 and September 1984. Given this relative timing, the PROs were operating during small parts of the first year of PPS for most hospitals. It is accordingly difficult to attribute admissions declines in Year 1 directly to the operations of the PROs. Second, published evidence fails to document large, direct effects by the PROs. For example, even when the PROs were operating, the proportion of direct denials of preauthorization apparently was extremely small (less than one percent for the Connecticut PRO studied by Imperiale, Siegal, et al., 1988); and the rate of denials was related to declines in admissions only for relatively small hospitals--i.e., for hospitals with 350 beds or less (Hadley, Zuckerman, and Feder, 1989). Third, if the direct effects of the PROs seem unlikely to have caused the admissions decline, it remains possible that the PROs indirectly reduced admissions, through a sentinel effect. But no published study of which we are aware rigorously documents such an effect.

- A second possibility: the assumption that hospitals faced an incentive to increase inpatient admissions may itself be wrong. On balance, for particular procedures at least, hospitals may have faced greater incentives to shift admissions to outpatient treatment, rather than to increase inpatient admissions. Changes in technology and medical practice permitted--and the PROs and Health Care Financing Administration (HCFA) regulations may have encouraged--such shifts (see, e.g., Eggers, 1987; and ProPAC, 1990). The principal evidence for this hypothesis is the large shift of inpatient procedures to outpatient settings that occurred under PPS. For example, DesHarnais, Chesney, and Fleming (1988b) found that a decline in admissions for lens procedures accounted for 54% of the total decrease in Medicare admissions under PPS for a cohort of 646 CPHA hospitals. Data reported by Fisher (1988a) show ophthalmology to have contributed more than any other specialty to the shift in surgical procedures to outpatient settings. Guterman, Eggers, et al. (1988) report that inpatient lens extractions decreased by 300,000 between 1983 and 1985. (See also Russell, 1989.) Latta and Helbing (1988) report large decreases in Medicare admissions for select DRGs between 1983 and 1985: DRG 39 (lens procedures, admissions down 75%), 134 (hypertension, down 59%), 183 (esophagitis, gastroenteritis, and miscellaneous digestive disorders, age 18-69, without complications or comorbidity, down 63%), and 294 (diabetes, age greater than 35, down 35%). Changes in how hospitals coded DRGs after the

introduction of PPS make any implications from these latter data tentative; and the controls in these studies for confounding effects are imperfect. These data document, however, that the admissions decline under PPS was not uniform across DRGs, but was selective, in ways possibly reflecting incentives to increase outpatient treatment, rather than inpatient admissions.

Published studies do not permit definitive tests of the two hypotheses outlined above. Indeed, the problem is more complex than these hypotheses suggest. As discussed in Section I.B above, and in more detail by Russell (1989) and others, the decline in Medicare admissions rates in the 1980s was less than the decline in non-Medicare rates. These results raise the possibility that changes in practice patterns that Medicare experienced may be "at least partly the consequence of forces that go well beyond prospective payment and its review mechanisms." (Russell, 1989, p. 46.) To be sure, the few studies that attempt to control for the experience of other payers, as well as for a more general class of health care system variables, still tend to find an independent effect for PPS on admissions (e.g., Hadley and Swartz, 1989, examining the impact of regulatory and other factors on hospital costs). But these studies leave us with little definitive understanding of why PPS had that independent effect. In the end, the biggest surprise of PPS--the admissions decline--is not well explained.

2. Length of Stay

Prior to PPS, the average length of stay (LOS) for Medicare beneficiaries was declining slowly. The introduction of PPS was expected to accelerate the trend. Indeed, the most conspicuous incentive of the new reimbursement system was the benefits it promised to hospitals that could reduce lengths of stay. Correspondingly, the most conspicuous fear of the new system was that it would induce hospitals to discharge patients too quickly.

The results on LOS are generally consistent with expectations: the introduction of PPS is associated with a brief, but (compared to historical norms) large, reduction in LOS, after which average LOS stabilizes or increases slightly. However, as discussed below, these results are subject to some important qualifications and uncertainties. We reviewed almost 40 studies that in various ways estimate the effect of PPS on lengths of stay. Four studies find no significant change in LOS in the first year or two of PPS:

- One study of elderly pneumonia patients in a single hospital finds a slight, insignificant increase in LOS (Simons and Omundsen, 1988).
- Three studies find LOS declines that are insignificant for at least some subgroups of patients (DesHarnais, Chesney, and Fleming, 1988b; Mayer-Oakes, Oye, et al., 1988; and Morrisey, Sloan, and Valvona, 1988a).

The remaining studies all find decreases in LOS, according to the different data and methods the papers use.[20] Russell (1989, p. 28) places the LOS declines in perspective:

[20]Note that, while the remainder of the studies find declines in LOS, some of the studies do not test the decreases for statistical significance.

> Historically, length of stay for the elderly had declined steadily, drifting slowly downward from 13.8 days in 1968 to 10.1 days in 1982 [table omitted]. The declines in the two years before prospective payment were unusually steep by historical standards, but the decline between 1983 and 1984, when the average dropped by nearly a day, was unprecedented, ample reason to suspect that prospective payment was the cause.

After an initial, sharp effect, the effects of PPS on LOS appear to moderate: PPS is associated with a decrease in LOS in the first, or first and second, years of implementation only.[21] Thereafter, the 11 studies that include at least three years of PPS data find LOS to have stabilized, with at most slight increases or decreases in the years thereafter (e.g., note the findings of the large-area studies with data for at least three years of PPS: Guterman, Eggers, et al., 1988; Helbing and Keene, 1989b; Lave, 1990; Menke, 1990;[22] ProPAC, 1991; Russell, 1989; Schwartz and Mendelson, 1991). The fact that nominal LOS was stable in later PPS years implies that LOS likely continued to decline for comparable patients, since the complexity of the average Medicare case increased over time. However, no published study rigorously documents that LOS continued to decline after two years on PPS. In an unpublished study, Gaumer and Fama (1988b) find that a small, additional decline in LOS occurred in 1986 (following much larger declines in 1984 and 1985), when the changing DRG mix of cases is taken into account; by contrast, using a similar adjustment for severity, Lave (1990) finds a small increase in LOS in 1986. The reason for the conflicting results is unclear. In any event, severity adjustments in these studies fail to take account of within-DRG changes in severity or to eliminate changes in case mix caused by changes in coding unrelated to actual patient severity. Unfortunately, studies with more sophisticated severity adjustments (e.g., Epstein, Bogen, et al., 1991; and, especially, Kahn, Keeler, et al., 1990) only have data for limited periods of PPS. Thus, some continued decline in LOS likely occurred for comparable patients, but that result is not well documented.

The published literature does document other important aspects of the effects of PPS on LOS. It appears that hospitals' respond strongly when they shift onto the system, but their response is limited in duration, whatever the year they shift onto PPS (Hadley, Zuckerman, and Feder, 1989). As with admissions, the relative magnitude of the hospital LOS response appears to be related to the degree of fiscal pressure the hospital faced (Ibid.; and Feder, Hadley, and Zuckerman, 1987). In general, hospitals were not selective in their reductions: LOS reductions appear to have been made "across the board," rather than selectively--that is, the reductions are not specific to certain DRGs or to specific age, race, or sex categories (Long, Chesney, and Fleming, 1989; and Guterman, Eggers, et al. 1988). However, the decline is not completely uniform: for example, Manton and Liu (1990) evaluate changes in utilization for a particularly vulnerable group--community-resident, functionally disabled beneficiaries--and finds LOS constant between pre- and post-PPS periods for certain subgroups.

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[21]One study (Newhouse and Byrne, 1988) finds no effect in the first year, but a slight effect in the second year. More will be said on this paper momentarily.

[22]Menke's regression analyses find the greatest effects of PPS on LOS in the eighth and ninth quarters of a hospital's being on PPS. Strictly speaking, this carries the LOS effect over to the third year of PPS.

Findings with respect to the effect of PPS on pre-PPS variations in LOS are conflicting: Guterman, Eggers, et al. (1988, p. 69) find that, through 1986, the distribution of average LOS across hospitals "has not changed much" (hospitals with short stays before PPS had about the same decrease in LOS as hospitals with long stays); and DesHarnais and others (1987, 1988b) find similar downward shifts in LOS for all regions.[23] By contrast, Helbing and Keene (1989b, p. 101) find that, by 1986, "PPS has had an impact in substantially reducing regional variation in [average LOS] that existed prior to PPS," for hospitals under PPS. These different conclusions are not directly comparable--they use different measures (LOS for all discharges versus surgical discharges), covering different years (through 1985 or 1986), for different hospitals (all hospitals, versus only hospitals on PPS). The implication is that no simple statement summarizes the effects of PPS on regional variations in LOS--regional variations that in any event remain poorly understood.

The available studies thus suggest that PPS is associated with an initial, substantial effect, with stable lengths of stay thereafter. It is difficult to know whether the recent stabilization in LOS would have characterized a world without PPS, or whether the historical decline in LOS prior to PPS would have continued without PPS, and in due course caught up to the LOS levels evident in the PPS data. In any event, notwithstanding the strong evidence that PPS had the expected effect on LOS, three complications should be noted:

- Virtually all of the studies measure LOS for Medicare admissions to short-stay hospitals, with no attention to LOS for Medicare hospital admissions to units and hospitals exempt from PPS. Newhouse and Byrne (1988) estimate average LOS for all patients covered by Medicare and find that average LOS actually rose in 1984. Only in 1985 does average LOS drop below pre-PPS LOS. The likely reason that overall LOS increased in 1984 is that the percentage of all elderly patients with extremely long stays increased sufficiently to offset any decreases in LOS with other patients. The authors conclude that, while LOS clearly decreased among patients in non-exempt hospitals, the decline in LOS may have been later, and smaller, than generally believed. To that extent, the effects of PPS on LOS--as measured looking at short-stay hospitals alone--are overstated, particularly insofar as short-stay results are confused with results for all elderly hospitalizations that Medicare covers.

- The difference in patient groups before and after PPS affects these estimates in a second way. The patients who continue to be admitted to short-stay hospitals after PPS may be more severely ill on average than those admitted before PPS. LOS estimates that fail to take this into account--that is to say, most estimates--will (if the assumption is true) tend to understate the effect on LOS associated with PPS. However, available large-scale data bases make adjustments for case mix and case

[23] Indeed, the study by DesHarnais and others (1988b) finds that surgical LOS reductions continued in the West in 1985--notwithstanding that the West already had relatively low lengths of stay--while surgical LOS in other regions had stabilized by that time.

complexity difficult.[24] As a result, estimates of the LOS effects associated with PPS may understate the true effects, thus raising a complication with the opposite implication of the Newhouse and Byrne study.

- Most of the studies do not use multivariate analysis to isolate the effects of PPS and to attempt to control for potentially confounding variables. However, this qualification may be of little practical effect: the studies using multivariate methods consistently find reductions in LOS (e.g., Menke, 1990).

Even with these complications, there is little dispute that--at least for the hospitals subject to PPS--LOS declined, then stabilized. Given that result, the question becomes exactly how the cuts in LOS have been made. The likely answer is that some care previously performed during a hospital stay is now performed outside the stay, either before or after an admission--in settings where reimbursement is cost-based under Part B. However, as we will discuss later in this review, when we examine outpatient and post-hospital care, it is difficult to establish how the composition of episodes that continue to be admitted to hospitals has changed: that is, to establish what services have been shifted out of the hospital stay, for patients that continue to be admitted to the hospital after PPS. We do know that the shorter lengths of stay after PPS do not simply compress the same effective treatment within a shorter period and, to that extent, that the LOS data after PPS reflect a different hospital product: a different division of labor among hospitals, outpatient clinics, physicians offices, nursing homes, and other providers of care. But data limitations make it difficult to establish precisely where all the pre-PPS care has moved in the post-PPS era.

3. Intensity of Care

With fixed reimbursement for each DRG, hospitals face a clear incentive under PPS to economize on the resources devoted to each admission. Reducing lengths of stay provides one means to economize on those resources. A second way was to change the intensity of care: specifically, to reduce the number of laboratory and other tests, therapeutic procedures, educational sessions, medications, days of intensive care unit (ICU) and coronary care unit (CCU) utilization, and other procedures; or to increase Part B physician resources. Obviously, there are trade-offs among all these different cost-reducing possibilities. For example, cost-effective reductions in hospital lengths of stay might require more intensive physician attendance, physicial therapy, education, and tests, to expedite discharge. Thus, we may not expect the intensity of care to decrease for every different procedure or test, but the general tendency should be for the intensity of care to decline.

The published literature suggests that the results basically conformed to preliminary expectations: there was a general tendency under PPS toward a reduction in the intensity of care. Specifically:

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[24] After 1983, hospitals faced incentives to code comorbidities more completely and to code principal diagnoses to higher-weighted DRGs. In fact, there were large shifts among DRGs in the early years of PPS, as we will discuss later in this chapter (see section A.4).

- Inpatient physician services--One potential mechanism for achieving shorter lengths of stay in hospital admissions would be to devote more physician resources to each patient. Physician visits and consults are not constrained by PPS, as they are reimbursed (based on charges) under Part B. The best available studies of physician services during an inpatient stay (Menke, 1990; and Mitchell, Wedig, and Cromwell, 1989) link Part A and B claims for four states (1983-1986), thus permitting estimates of utilization in conjunction with individual hospital admissions. These studies suggest that there has been an increase in inpatient consultations, but a decrease in inpatient visits, with the introduction of PPS.[25] Studies based on CPHA data by DesHarnais and others (1987, 1988b) find no change after PPS in the percentage of inpatient cases with at least one consultation.

  These studies do not permit comprehensive measurement of physician services, nor do they permit adjustment for certain factors (such as length of stay) that would be helpful for our purposes. But the studies do tend to refute the hypothesis that the intensity of physician services increased after PPS. Notwithstanding that physician services were reimbursed outside PPS, hospitals do not appear to have economized by devoting more physician resources to patient treatment.

- Laboratory, x-ray, and other tests--According to one study using CPHA data through 1984, there was no significant decrease in the proportion of patients receiving particular lab and other tests at least once during their hospital stay (Long, Chesney, et al., 1987). However, a second study--also using CPHA data, but through 1985--finds a decrease in the proportion of Medicare patients receiving particular tests at least once (Sloan, Morrisey, and Valvona, 1988d). Meanwhile, in some studies and for some tests, the average number of tests increased after PPS, but not as quickly as before. For example, one study suggests that the proportion of patients receiving CT scans increased after PPS, as did the number of CT scans per patient; but against the pre-PPS trend of rapidly increasing utilization, post-PPS growth rates were lower (Sloan, Morrisey, and Valvona, 1988d).

  As noted by Russell (1989) and others, many of the tests once done in the hospital may now be done before or after the hospital stay, outside PPS reimbursement. Virtually all of the available studies measure inpatient utilization alone and therefore cannot establish whether the composite of inpatient and outpatient tests and procedures declined post-PPS. The closest study to this issue is Menke (1990), which links claims for Part A and B in four states to construct episodes of care around inpatient events. Focusing on a set of 11 groups of related DRGs, she finds substantial percentage increases in expenditures across most Part B outpatient types of service associated with a hospital stay--including lab, radiology, and special tests--and percentage decreases for many Part B inpatient expenditures, including

[25]The decrease in inpatient visits is compensated by an increase in outpatient visits in the studies of both Menke and Mitchell et al.. Note that the Menke study measures physician services in terms of dollars, while the study of Mitchell et al. measures visits or consultations per enrollee.

lab and radiology claims, leading her to conclude that there has indeed been some substitution of outpatient for inpatient testing. However, the volume, as opposed to the dollar cost, of tests is not reported in this published work; and these descriptive results are uncontrolled for changing severity of illness.

- ICU/CCU utilization--With fewer, likely sicker patients on average, the percentage of patients using the ICU and CCU might be expected to increase. Instead, studies tend to find a slight decrease in this percentage in the first year of PPS, followed by an increase beyond pre-PPS levels in the second year (DesHarnais, Chesney, and Fleming, 1988b; and Sloan, Morrisey, and Valvona, 1988d; see also comments of Russell, 1989, pp. 30-33). Lengths of stay for patients admitted to ICUs or CCUs appear to have decreased, although the decrease appears to be insignificantly different from the pre-PPS trend. By the third year of PPS (1986), unadjusted data show days of ICU/CCU care to have increased absolutely and as a percent of total days of care, compared to 1983 (Fisher, 1988b; and Sloan, Morrisey, and Valvona, 1988d).

- Physical therapy--Most of the evidence points to a reduced utilization of physical therapy per patient. Three studies of elderly hip fracture patients (Fitzgerald, Fagan, et al., 1987; Fitzgerald, Moore, and Dittus, 1988; and Palmer, Saywell, et al., 1989) find a significant decline in the average number of physical therapy procedures per hip fracture patient, although two of the three studies find a modest increase in the number of procedures per day. A fourth, large-sample study (Sloan, Morrisey, and Valvona, 1988d) finds a significant decline in the proportion of Medicare patients generally who received physical therapy after PPS. Dore (1987) disagrees, finding a large, post-PPS increase in a simple count: the total number of referrals for physical therapy for Medicare patients in one county's hospitals.

- Patient education and psychosocial services--A study of elderly diabetes patients in one hospital (Weinberger, Ault, and Vinicor, 1988) finds a post-PPS decrease in the proportion of patients receiving dietary education and other consultations, with important adverse effects for later emergency room utilization and readmission. A study of a second hospital (Lyons, Hammer, et al., 1987) finds a substantial increase in the proportion of patients referred to three psychosocial services in one hospital. These referrals may have facilitated reductions in the hospital's average length of stay. These studies show two different reactions to PPS by two different hospitals for two different services; but the studies are similar in their suggestion that greater use of certain services might be a more cost-effective practice pattern, given the reduced lengths of stay under PPS.

- Number of medications--Long and others (1987, 1989) find no significant change in the number of medications, through the first year of PPS.

Overall, the studies reviewed above generally show PPS to have reduced the intensity of care or, at best, to have left the intensity of care unchanged. The results of these studies should be interpreted with caution. Approximately one-half of the studies are of small or select populations,

and few of the studies employ multivariate methods to isolate the effects of PPS. In addition, for most dimensions of the intensity of care, feasible substitutions of outpatient procedures for inpatient procedures (e.g., for lab and other tests) are not measured.[26] But the studies are at least suggestive that post-PPS patients receive somewhat less intensity of care than pre-PPS patients.

Perhaps the most important point to emphasize in interpreting these results is that a decline in rough measures of quantity should not be confused with a decline in quality. The best study of the quality of care using explicit and implicit process criteria--including appraisals of the appropriate use of ICUs, therapeutic and diagnostic tests, and other procedures--actually finds an improvement after PPS (see reports of the RAND quality of care study in Kahn, Keeler, et al., 1990; and Rubenstein, Kahn, et al., 1990). Thus, while post-PPS patients may receive somewhat fewer tests and procedures than pre-PPS patients, there is little evidence that they receive fewer appropriate tests and procedures.

4. Case Mix and Severity of Illness

PPS establishes a direct link between hospital payments and the coding of the medical record, thus giving hospitals a new incentive to develop more complete records and coding to maximize reimbursement. The introduction of PPS was thus expected to increase the nominal case weight (the volume-weighted average DRG weight) and the Case Mix Index (CMI, the unweighted average DRG weight across hospitals). At the same time, other factors were also expected to increase the average case weight: a change in the mix of the severity of patient conditions (due to shifts of less complex cases to outpatient settings) and possible increases in the resource requirements for treating given conditions as practice patterns changed.

All sources agree that the CMI and the average case weight were higher after PPS than before, and increased more in the first and second years of PPS than in following years. For example, Steinwald and Dummit (1989) report ProPAC estimates that, depending upon which index is used, place the growth at 5.9%-7.7% in 1984, declining each year thereafter to approximately two percent in 1987. The increase in 1988 was unusually large (approximately 3.5%), when age was eliminated as a DRG classification criterion and two heavily weighted DRGs were created (ProPAC, 1990). Case-mix indices have generally been higher for large, urban, and teaching hospitals and increased at a faster rate for them (Ginsburg and Carter, 1986; ProPAC, 1990; and Steinwald and Dummit, 1989). For hospitals in waiver states coming onto PPS in 1986 (Massachusetts and New York), the case-mix increases were significantly larger in their first year on PPS than in their last years on waivers (Steinwald and Dummit, 1989).

Estimates by ProPAC (e.g., Altman, 1990; and Report to the Secretary, 1990) indicate that case-mix changes have generated most of the increase in per-case payments under PPS--more than the annual PPS update factors and payment policy changes combined. Given these reimbursement implications, an important policy question arises: how much of the case mix increase is due to

[26]The effects of PPS on outpatient services are discussed in Section B of this chapter. The literature reviewed in that section suggests that outpatient tests and other outpatient procedures did increase after PPS.

real increases in the severity of patient illnesses (and associated real resource requirements), and how much is due to hospital upcoding and other artifacts of PPS incentives unrelated to the underlying cost of treating patients? The literature on case mix and severity of illness presents the following picture:

a. Data Flaws--One component in the CMI increase had nothing to do with hospital upcoding or hospital resource requirements. The flawed 1981 data on which the calculation of the original DRG weights was based made the 1981 case mix appear less complex on average than it was in fact (Steinwald and Dummit, 1989). As a result, the 1984 CMI would have increased (and payments to hospitals would have been greater than expected), even if nothing else had changed, simply due to the effect of processing the original weights through a more complete and accurate data set, such as the 1984 claims. In fact, this phenomenon apparently accounts for nearly one-half of the large (9.2%) 1984 increase in the CMI (Ginsburg and Carter, 1986). HCFA rebased the DRGs in 1985 as a partial correction.

b. Hospital Upcoding and "DRG Creep"--Upcoding by hospitals has been an obvious phenomenon from the beginning of PPS. For example, the percentage of Medicare inpatients with at least one coded comorbidity or complication rose from 46% in 1980 to 60% in 1984 (DesHarnais, Kobrinski, et al., 1987). An unpublished 1989 study by SysteMetrics reports that the average number of secondary diagnoses per patient increased from 1.9 to 2.7 between 1984 and 1986 (described in Steinwald and Dummit, 1989). Ginsburg and Carter (1986) estimate that almost one-third of the 1984 increase in CMI was due to hospital upcoding. Ginsburg and Carter tentatively surmised that the upcoding factor was not inconsistent with legitimate improvements in the accuracy of coding practices. However, later studies call that conclusion into question. Hsia, Krushat, et al. (1988) and Hsia (1990) find relatively high proportions of coding errors, a substantial proportion of which in each study were found to benefit hospitals economically. Thus, while much of the observed upcoding constitutes legitimate refinement in coding thoroughness and accuracy, the Hsia studies tend to corroborate the existence of "DRG creep"--systematic coding errors that tend to benefit the hospitals.

Whether due to errors or more aggressive and refined record-keeping, upcoding is an artifact of PPS scorekeeping and does not reflect real resource requirements to treat patients. Accordingly, ProPAC has sought to discriminate between upcoding and "real case-mix change," with the goal of compensating the latter but not the former (ProPAC, 1990; and ProPAC Report to the Secretary, 1990). It is, however, difficult to establish definitive estimates of the effects of the two different factors; and the SuperPRO data used in the past for key ProPAC case mix estimates are no longer available (ProPAC, 1991). Over time, coding practices might stabilize if PPS policies did not change. However, changes in PPS policies are inevitable; when they occur, they tend to create new opportunities for hospital upcoding (Ibid.).

c. Real Changes in Case Mix: Across DRGs--Real changes in the complexity of the case mix, within and across DRGs, are difficult to estimate. With respect to across-DRG changes, Ginsburg and Carter (1986) estimate that slightly under one-quarter of the increase in CMI in 1984 was due to changes in practice patterns, such as increases in heart surgery for certain conditions and the effects on the case mix of the large shift in lens procedures to outpatient settings. ProPAC has concluded that, as the overall rate of increase in the CMI has declined, the proportion that is real

increases: slightly more than one-half of the relatively small 1990 CMI change is ascribed to real changes in patient care resource requirements across DRGs, the balance being due to upcoding (ProPAC Report to the Secretary, 1990). There is evidence that most of the case mix increase for later years has a large real component (Carter, Newhouse, and Relles, 1990, evaluating the case mix increase for 1986-1987); but the uncertainty of such estimates remains large, so that the appropriate reimbursement implications are difficult to establish with any precision (Altman, 1990).

d. Real Changes in Case Mix: Within DRGs--Increasing complexity within DRGs (something not measured by increases in the CMI) could be due to changes in medical practice and/or to changes in the mix of patients admitted to the hospital. Studies done for ProPAC estimated that the within-DRG case complexity increased by approximately 1.6% to 1.9% from 1986 through 1988 (ProPAC Report to the Secretary, 1990). The increase in 1988 was particularly large (approximately 0.8%), but the actual or estimated increases for subsequent years declined and then stabilized, to an estimated 0.2% in 1991 (ProPAC, 1991). ProPAC speculated that the decline in the growth rate of within-DRG complexity was due to refinements in the DRGs themselves, a slowing in the shift of less complex cases to outpatient settings, and decreasing opportunities for hospital upcoding.

e. Severity of Illness Measures--Somewhat overlapping with the literature on case mix indices and within-DRG case mix complexity is the literature on severity of illness of admitted patients. This literature typically measures severity in terms of: 1) the clinical conditions of presenting patients, or 2) probable hospitalizataion outcomes (e.g., LOS or mortality) based on clinical conditions. The findings are mixed. Keeler, Kahn, et al. (1990) developed disease-specific measures of sickness at admission to predict 30- and 60-day probabilities of mortality for five diseases; they find an increase in the sickness at admission in 1985-1986 compared to 1981-1982. Sloan, Morrisey, and Valvona (1988a) developed predictors of length of stay from 1980 CPHA data and then applied the algorithm to 1983 and 1985 data, to estimate within DRG severity in terms of the likelihood of very long stays ("severe cases"); they found that, in these terms, case-mix severity within DRGs increased after PPS, although at a slower rate than before PPS.

By contrast, DesHarnais, Kobrinski, et al. (1987) used CPHA data to measure severity in crude terms: the number of body systems included in recorded diagnoses, a measure partly independent of recorded comorbidities and complications. They find that differences between the predicted and actual value for 1984 were not statistically significant. Meanwhile, small-sample studies based on medical records appear to find little change in the clinical conditions of patients after PPS. For example, the hip fracture studies of Fitzgerald and others (1987, 1988) Gerety and others (1989) and Palmer and others (1989) all found comparable clinical characteristics in pre- and post-PPS patients. Similar results are reached in the study of elderly pneumonia patients by Simons and Omundsen (1988), the study of non-insulin dependent diabetes patients by Weinberger and others (1988), and the study of patients with congestive heart failure by Rich and Freedland (1988). The results of the records-based studies are likely influenced by the fact that most of these studies focus on conditions for which the shift to outpatient care has not been been substantial. Records-based studies of patients undergoing procedures that have experienced substantial shifts to outpatient care--e.g., lens procedures--would doubtless show more significant increases in the average severity or complexity for post-PPS patients admitted to the hospital.

The mix of results on clinical severity of illness is somewhat surprising, inasmuch as the decline in admissions and LOS under PPS gave rise to the logical inference that the patients continuing to be admitted were more severely ill. Perhaps the best way to reconcile these findings is to note again that the decline in admissions under PPS was selective, having significant impacts on average severity for some DRGs (e.g., DRGs with substantial shifts to outpatient treatments), but relatively little impact on others.

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Based on the review above, the literature on case mix and severity of illness documents that PPS: 1) has had one case mix increase due to data problems with the calculation of the original DRGs; 2) has had the expected efffect of encouraging upcoding and DRG creep, and 3) has been accompanied by the expected real case mix increases, due to outpatient substitution and other changes in medical practice. Meanwhile, for particular diseases and conditions, the literature is mixed as to whether (in terms of measures or probability estimates largely based on clinical conditions) the severity of illness has changed since PPS.

The case mix/severity issue is critical to PPS, given its implications for reimbursement. It remains technically difficult to sort out the different factors at work; and the limitations of available data for making such estimates are significant. ProPAC expected CMI change to diminish sooner than it has (e.g., ProPAC, 1991). Research in this area will remain important, so long as reimbursement is so directly tied to medical records and the ways they are coded. In addition, since PPS coding incentives change the kind of patients in particular DRGs over time, research findings on the effects of PPS will be problematic if they are: 1) based on comparisons over time (e.g., pre- and post-PPS), and 2) use DRGs as an important independent variable. This is not a small or isolated problem: it applies to a large portion of the research on the effects of PPS, as Russell (1989), in particular, takes care to note.

5. Effects of PPS on Inpatient Practice Patterns in Non-Exempt Hospitals: Conclusion

The findings reviewed to this point suggest that PPS has had a significant effect on admissions, lengths of stay, intensities of care during stays, and the real and nominal case mix of admitted patients. All but the admissions effects were in the expected directions, and the unexpected reduction in admissions meant that a potential negative effect of PPS had been avoided--for reasons that still are not well documented. Case mix changes have been more persistent than expected (and very costly), but appeared by the end of the decade to have stabilized somewhat.

As the 1990s began, PPS appeared to have achieved the key changes in hospital practice patterns that had been hoped and to have avoided the worst fears that accompanied implementation. Questions remain about the implications of these changes for Medicare expenditures, quality of care, hospital finances, and other important objectives. Those questions are addressed in other sections. The task remaining for this section is to complete the picture of of how PPS changed practice patterns: specifically, given the changes in non-exempt hospital practice patterns, we need to explore how how the division of labor among hospitals and other

providers has changed in response. In the next three sections, we examine that issue, in terms of the effects of PPS on outpatient services, post-hospital care, and exempt hospitals and units.

B. Effects on Outpatient Services

Expectations that PPS would change hospital practice patterns were accompanied by expectations of how outpatient services would be affected. The natural prediction was straightforward. In conjunction with the utilization review of the PRO, PPS was expected: 1) to shift many tests and other preparations for surgery or medical treatment to hospital outpatient clinics, and 2) to shift many surgical and other admissions to outpatient clinics, freestanding ambulatory surgical centers, and other outpatient settings.

Estimates of the actual effects are hampered by the difficulty of linking inpatient and outpatient data at the patient level and the inaccuracies and inconsistencies in coding of much of the outpatient data. Without linked, consistent, accurate data, it is difficult to establish how episodes of patient care changed with the introduction of PPS. But some studies using linked data are available. In any event, certain particularly large effects of PPS on outpatient services are apparent in aggregate inpatient and outpatient statistics.

No published study specifically estimates how much diagnostic testing and other preparations for surgery or treatment have, under PPS, been moved to an outpatient setting, prior to an admission. The studies that are available, however, reach results consistent with the hypothesis that some shifting has in fact occurred. First, studies based on CPHA data examine changes in pre-operative LOS for surgical procedures; these studies find that patients are spending less time in the hospital before undergoing surgery. For example, DesHarnais and others (1987) find that pre-operative LOS declined more than expected in 1984; there is a further decline in 1985, but it is not statistically significant (DesHarnais and others, 1988b).[27] Long, Chesney, et al. (1987) report decreases in 1984 in pre- and post-operative lengths of stay for patients across five different discharge locations. Less time in the hospital before surgery, as suggested by these studies, would mean that some of what was previously done after admission is likely now to be done before. Second, two studies are available based on a linked Part A and Part B file for four states from 1983 through 1986 (Menke, 1990, which focuses on 11 groups of representative DRGs; and Mitchell, Wedig, and Cromwell, 1989). Given the pattern of decreases in inpatient physician charges and increases in outpatient charges apparent in this data, Menke's study finds evidence for outpatient substitution on lab, radiology, and physician visits associated with inpatient episodes. Mitchell et al. (whose study did not focus on a subset of DRGs) find evidence for substitution in radiology and special diagnostic tests.

The published studies are more definitive if we do not restrict ourselves to outpatient substitution prior to an admission and ask questions about outpatient substitution generally. The incentive for hospitals to shift surgeries and other treatments to outpatient settings--where prospective reimbursement could be avoided--doubtless varied for different procedures. For

[27]By contrast, declines in post-operative LOS are not statistically significant in both years.

example, even when outpatient surgery was a feasible option, other factors than simply the avoidance of prospective payment would enter the decision: clinical feasibility, the utilization review of the PROs, the relative generosity of reimbursement for outpatient treatment, inclinations of attending physicians, and other considerations. Notwithstanding the lack of information on many of these factors, the findings of the research are relatively consistent. PPS was accompanied by a substantial shift of surgeries and other inpatient procedures, as well as physician visits, to outpatient settings. The shift appears to have been selective to some degree, however, affecting particular kinds of treatments (particularly surgeries) far more than others.

Virtually all studies show a sharp shift in physician services away from the inpatient setting to the outpatient setting, according to a variety of different measures. For example:

- From 1983 to 1986, the place of service for physicians' charges changed dramatically: in 1983, approximately 61% of Medicare physician dollars were for services delivered in the hospital; by 1986, the percentage had dropped to 47% (Fisher, 1987, 1988b). Physician services in offices and, particularly, outpatient clinics make up the difference. Hadley, Zuckerman, and Feder (1989) use AHA data and multivariate methods to determine that PPS has an independent effect of increasing outpatient visits more than 10%, while reducing inpatient discharges 8%-9%. Menke (1990) uses linked Part A and B data for 1983-1986 for four states to show large increases in outpatient expenditures associated with a hospital admission: outpatient expenditures per admission rose at least 50% for two-thirds of the DRGs studied and rose more rapidly than inpatient expenditures for all of the DRGs. Mitchell, Wedig, and Cromwell (1989) use the same data base to show that the number of physician visits per beneficiary changed hardly at all from 1983-1986; however, outpatient office visits per beneficiary increased 21%, while hospital visits decreased by the same proportion.

- Allowed charges for physicians/suppliers for inpatient surgical services total almost $4.6 billion by 1986, but show only a trivial change from 1983 through 1986 (Fisher, 1988b). Over the same period, surgical types of service performed in outpatient clinics increased over 500% (to almost $2.1 billion in 1986) and in physician offices increased nearly 70% (to $1.2 billion). From 1983 through 1986, the share of ssurgical charges for inpatient surgery dropped from 80% to 57%.

  This growth in allowed charges reflects more than a shift in the number of procedures. It reflects as well changes in the complexity of procedures and general increases in prices. It is not possible to sort out all of these changes, but even in relatively conservative terms--e.g., the number of physician/surgeon bills per 1,000 enrollees--the growth has been explosive: over 100% for hospital outpatient departments, almost 35% for physicians' offices, and nearly 800% for ambulatory surgery centers, with the growth over all outpatient sites being 55% (Leader and Moon, 1989). Hadley and Swartz (1989) find that--controlling for a large array of Medicare, other payer, cost, and other variables--PPS had the effect of increasing outpatient surgery visits by one-third.

- As noted earlier, the large growth in outpatient surgeries is driven by the large shift in lens procedures (DesHarnais, Chesney, and Fleming, 1988b; Latta and Helbing, 1988; and Fisher, 1988a, 1988b), which alone account for perhaps one-half of the total shift. In 1980, 87% of all opthamologists' surgical charges to Part B were for inpatient surgeries; by 1985, only 25% of these charges were inpatient surgeries (Fisher, 1988a)--even as the proportion of all surgical bills attributable to opthamologists increased slightly (Leader and Moon, 1989). Acting through the PROs, HCFA specifically sought this shift; and outpatient reimbursement may have been more generous than inpatient reimbursement, according to unpublished studies cited by Russell (1989). HCFA's efforts appear to have been effective.

PPS thus appears clearly associated with a substantial shift in practice patterns to outpatient settings, much as originally hoped. This shift helps to explain why hospital admissions declined and may help to explain why the intensity of care in inpatient admissions also appears to have declined. In truth, the data in this area--across all inpatient and outpatient settings--are not so complete or consistent as to permit tracing of pre- versus post-PPS utilization patterns for Medicare episodes, in finer detail than large aggregates. We thus know the large trends in this area, but cannot document changes that occurred for particular kinds of episodes, across the full range of care, controlling for reasonably immediate, exogenous factors.

Notwithstanding these problems, it is widely agreed that large shifts to outpatient care were coincident with PPS. How much of the shift was actually due to PPS? Russell (1989) and others cite evidence suggesting that shifts from inpatient admissions to outpatient care were actually greater for non-Medicare patients than for Medicare patients. This evidence suggests that factors beyond PPS play a significant role in the changing Medicare practice patterns we observe, although research to date does not generally permit us to weigh the contributions of PPS against other, more systemic factors.

C. Effects on Post-Hospital Care

Although it is nowhere explicitly measured, some of the shift to outpatient care described in the previous section--e.g., the increase in the rate of physician visits at outpatient sites--doubtless occurs after hospital discharge. But there is a more general class of post-hospital utilization that was expected to perform the same role: to take care of sicker patients in a more cost-effective setting, following earlier discharges from the hospital. The providers implicated in this expected change included, most prominently, nursing homes and home health care agencies. The key questions have been, first, whether hospital discharges to nursing homes and home health care have increased; and second, whether the discharged patients have been sicker on average, given the decline in hospital lengths of stay.

Efforts to answer these questions are especially hampered by the multiplicity of payers for post-hospital, particularly nursing home, care that elders receive. With greater fragmentation among payers, and changes in coverage and payment policies over time, the possibility of developing relatively complete utilization profiles and of isolating the effects of Medicare PPS alone diminishes. As Russell (1989, p. 37) notes:

> ... no single source can give a valid statistical picture of the changes that have taken place in posthospital care. No single payer has covered enough patients in a consistent fashion over enough years to permit analyses that can separate prospective payment's effects from those of other changes taking place around the same time.

As a result, the conclusions of different studies frequently conflict; and the role of PPS in the picture that emerges is frequently qualified.

1. Rates of discharge

The literature on rates of discharge to nursing homes and home health agencies present different results and different complications. In almost every study of the issue, home health utilization is found to have increased after PPS. However, studies of nursing home utilization presents a more complex picture. We will discuss each group of providers separately.

a. Nursing homes--In terms of certain simple, aggregate proportions, discharges to nursing homes appear to have increased:

- The simple proportion of hospital discharges to SNF care covered by Medicare was stable or declining slightly prior to PPS, then appears to have increased in 1984 and 1985, as expected (e.g., Gornick and Hall, 1988; Guterman, Eggers, et al., 1988; Latta and Keene, 1989b; and Morrisey, Sloan, and Valvona, 1988b).

- Less direct measures tell a similar story. Users of the Medicare SNF benefit per thousand enrollees--and total covered days of Medicare SNF care per thousand enrollees--appear to have been declining prior to PPS, but to have increased in 1984-1985 (Silverman, 1991). Thereafter, rates of use and covered days declined to pre-PPS levels by 1987. But these rates increased substantially in 1988, due to HCFA administrative changes,[28] and then increased at truly unprecedented rates in 1989, under the liberalized coverage provisions of the Medicare Catastrophic Coverage Act (MCCA; see ProPAC, 1990). PPS may have been a factor in the increases in all of these rates in 1984-1985; but the best explanation for the trends thereafter is HCFA administrative changes and fundamental changes in Medicare coverage.

Thus, according to these simple, unadjusted statistics, discharges to Medicare SNFs increased as expected when PPS was introduced, then followed a pattern of decreases and increases that track HCFA policy and Medicare coverage changes.

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[28] As discussed by Silverman (1991), HCFA responded to the 1984-1985 increases in utilization by instituting a series of administrative changes and intermediary reviews. By 1987, discharge rates and covered days of care per 1,000 enrollees were near or below historical lows. Lawsuits and political complaints about the equity and consistency of these changes resulted in a thorough revision in HCFA policy--and dramatic increases in utilization in 1988, back to the much higher discharge rates of the mid-1970s.

Given the confounding effects of the latter factors, the most important question is whether discharge rates to nursing homes increased in the early years of PPS, before the influence of the non-PPS, policy and coverage factors was felt. Studies of Medicare discharges that control for the pre-PPS trend and the PPS effect on admissions reach conflicting findings. Some studies suggest that there in fact was little, if any, increase in discharges to nursing homes in the initial years of PPS.[29] One study is based on data through 1985 for a sample of 646 CPHA hospitals. It shows that the proportion of Medicare discharges to SNF or ICF care--irrespective of the payer for the SNF/ICF care--generally did not increase significantly in 1984 or 1985 against projected rates for those years (DesHarnais, Chesney, and Fleming, 1988b). When the discharge rates to SNFs and ICFs are adjusted for the decline in admissions, none of the changes in proportion is statistically significant (Russell, 1989).[30] Using CPHA data through 1984, Long, Chesney, et al. (1987) adjust for the change in admissions by using a different approximation than Russell: a body system count methodology to control for severity of patient illness. Their study finds only a "slight" increase in the proportion of Medicare patients discharged to SNFs and ICFs in 1984.

Thus, some studies of the general Medicare population that adjust for the pre-PPS trend and the case-mix effects of admissions declines find no evidence of a substantial increase in the rate of discharges to nursing homes--even when (as with the CPHA data) discharges not covered by Medicare are taken into account. At most, the increases that are found are slight. Numerous studies of select Medicare sub-populations reach a similar conclusion that PPS did not significantly increase discharges to nursing homes: e.g., the study of Liebson, Naessens, et al. (1990), which examined hospitalizations for residents of a Minnesota county through 1987 and found no significant increase in nursing home transfers when the data were controlled for patient characteristics (including disease complexity and severity); the study of Manton and Liu (1990), which examined data from the National Long Term Care Survey for 1982 and 1984 for community-resident, disabled Medicare beneficiaries and found no significant increase in discharges to Medicare SNF care; and the study of Rich and Freedland (1988), which examined discharges of elderly patients with congestive heart failure from a St. Louis hospital (1983-1986) and found no change in the simple proportion of patients discharged to nursing homes.

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[29]Adjustments for the pre-PPS trend are obviously an approximate way to incorporate changes in practice patterns already occurring before PPS was implemented. Adjustments for the decline in admissions are needed in order to take account of how that decline affects the probabilities of discharge to post-acute care. Two relatively crude, but practical, approaches have been used. First, researchers can attempt control for the effects of the admissions decline: typically, by controlling for changes in the severity of illness of patients after PPS. Second, researchers can make the assumption that most of the patients no longer admitted after PPS (e.g., patients now receiving cataract surgery as outpatients) likely would not have required any post-hospital, sub-acute care in any event. If the assumption is true (and nothing else changes), the diversion of these patients will increase the proportion of patients discharged to any particular post-hospital location, simply because the denominator has decreased. A practical adjustment is simply to add the decline in admissions to the denominator (Russell, 1989). Momentarily in the text, we will review studies that use case mix controls and others that use direct adjustments for the decline in admissions volume.

[30]Without the adjustment for declining admissions, DesHarnais et al. find only limited increases in discharges to SNFs/ICFs: for the two PPS years (1984 and 1985) and the two nursing home destinations (SNFs and ICFs), only one discharge rate was significantly different from 1983 (the discharge rate to SNF care in 1985). After Russell's adjustment for the declines in admissions, none of the changes in discharge proportions to SNFs or ICFs is statistically significant.

But other studies conflict, finding a substantial effect on discharges to SNFs or to nursing homes generally. Most important, the RAND study of the quality of care under PPS examines discharge destinations for a national sample of patients with five representative diseases for the years 1981-1982 and 1985-1986. The study finds a significant increase (from 23% to 27%) in the proportion of patients admitted from home who are not discharged home (Kahn, Keeler, et al., 1990). Morrisey, Sloan, and Valvona (1988a) analyze discharge abstracts for five DRG groups from a sample of 501 CPHA hospitals for a set of pre- and post-PPS periods ending in 1985. They control for pre-PPS trend; for demographic, community, and hospital characteristics; and (primarily through a staging algorithm) for case severity. They find PPS to have had a large positive effect on discharges to SNFs--indeed, a larger effect on discharges to SNFs than on discharges to ICFs or home health care. This is the only large-sample study to conclude that PPS had a larger effect on the probability of transfer to SNFs than to home health care.[31] It is difficult to know why these singular results were obtained, except to note that the study was restricted to five DRG groups that were not chosen for being representative--they were chosen for being notably likely to result in post-hospital transfer, and some bias toward SNF discharges may have resulted.

Meanwhile, there are conflicts in other groups of studies as well. For example, medical records studies of hip-fracture patients in single hospitals before and after PPS (Fitzgerald, Fagan, et al., 1987; Fitzgerald, Moore and Dittus, 1988; Gerety, Soderholm-Difatte, and Winograd, 1989; and Kahn, Keeler, et al., 1990) generally have found significant increases in discharges to nursing homes, although a fifth such study (Palmer, Saywell, et al., 1989) finds no increase.

There is a report (without details) that Medicare SNF and home health utilization post-PPS are correlated with LOS reductions in hospitals (Guterman, Eggers, et al., 1988). It is therefore possible that there was indeed an increase in the proportion of SNF dishcharges for those patients whose hospital care was most affected (i.e., reduced) by PPS, but that this tendency has been masked by all of the other variations in the data. Furthermore, unlike home health (see below), the supply of nursing home beds is relatively inelastic, due to state Certificate of Need regulations and other factors. Some studies suggest that the supply of beds (measured in such terms as SNF beds per thousand elderly or the availability of swing beds in a particular hospital) has a significant effect on the ease of transfer (measured in terms of variations in lengths of stay). (See Kenney and Holahan, 1990, 1991; and Holahan, Dubay, et al., 1989.) This relationship could mean that increases in the discharges to nursing homes are attenuated by limitations in the supply of nursing home beds. That is, PPS may in fact have increased propensities to discharge to nursing homes, as hypothesized when PPS was implemented; but practical constraints in bed supply may have limited the effects of this shift in demand.[32] Notably, the most important

Note that the RAND study (Kahn, Keeler, et al., 1990) does not report discharges specifically to home health care. Note also that a small-sample study of Medicare patients admitted to medical intensive care units in three hospitals in Southern California (Mayer-Oakes, Oye, et al., 1988) did reach a similar result to the study of Morrisey et al.: a large increase in discharges to SNFs, but only a small increase in discharges to home care.

[32]It is also possible that the effects of nursing home bed availability are responsible for the positive relationship between lengths of stay and SNF discharges reported by Guterman, Eggers, et al. (1988). If lengths of stay tend to be shorter where nursing home beds are more plentiful--because there will then be fewer (of what used to be termed) administratively necessary days--there will tend to be a correlation between shorter lengths of stay and

studies in this area--whether or not they find increases in nursing home discharges--do not control for nursing home bed supply.

The results on the rate of discharges to nursing homes are thus conflicting for the early years of PPS, and it is difficult to reconcile these conflicts in any concise way. Some studies find the expected increase in nursing home use: e.g., an increase in the proportion of nursing home discharges of up to four percentage points in the RAND study. However, other studies find no significant increase. It at least appears that the initial effects of PPS on nursing home utilization were not so large and consistent as to register on all of the most reliable studies. Certainly, any trend in the proportion of discharges to nursing homes in the early years of PPS is far more complex than, say, the trends in hospital admissions, lengths of stay, and outpatient treatment.

Whatever the ultimate truth about the early years of PPS, the later years of PPS present a less ambiguous picture: while these later years have not been rigorously studied, it appears that changes in Medicare SNF utilization in the later 1980s were dominated by changes in HCFA payment policy following lawsuits and in Medicare coverage following MCCA. Indeed, these policy and coverage changes appear to have reduced SNF utilization by a magnitude much larger than any increases that may earlier have been caused by PPS. In other words, notwithstanding the focus of the PPS literature on the questions highlighted by PPS incentives, the larger story on SNF utilization in the second half of the 1980s likely concerns questions of policy and coverage, rather than the continuing effects of prospective reimbursement.

b. Home Health Agencies--If the data on discharges to nursing homes is conflicting, the data on discharges to home health agencies is relatively clear cut: when PPS was introduced, there were substantial increases in the proportion of discharges to home health. The principal difficulty with this relatively consistent finding is that it is particularly difficult to ascribe this increase to PPS itself, since Medicare policies for the coverage of home health were substantially changed in the years immediately preceding, and immediately following, PPS. Specifically, the Omnibus Budget Reconciliation Act of 1980 (OBRA 1980) eliminated the day limit and prior hospitalization requirement for home health care; in addition, it permitted profit-making home health agencies to operate in states without licensure laws. From 1981 through 1983, annual home health visits covered by Medicare increased 20% to 39% annually, while patients served grew 14% to 31% annually (ProPAC, 1989). By 1984, however, HCFA issued new policy instructions that had the effect of denying home health care reimbursement for certain patterns of care (in particular, for care that was full-time or was not intermittent under the regulations). The average annual growth in total Medicare home health visits and total patients served from 1984 through 1988 was actually slightly negative, an average for four years that masks a large positive change in one year: 1984 (Ibid.). Thus, in terms of simple statistics, home health care utilization grew dramatically in the three years preceding PPS, under the influence of OBRA 1980 reforms; and then slowed in growth, particularly after 1984. Lawsuits overturned the HCFA instructions in 1987, auguring a future of increased growth (note the summary statistics in ProPAC, 1990).

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nursing home transfers, other things being equal.

This general description suggests that overall utilization of home health care in the 1980s was more affected by coverage and policy decisions than by PPS. Even if it is true that other factors had a more powerful influence than PPS, however, careful studies suggest that PPS was accompanied by a statistically significant increase in the proportion of discharges to home health agencies. For example, DesHarnais, Chesney, and Fleming (1988b) find statistically significant increases in the proportion of discharges to home health in both 1984 and 1985. Russell (1989), who adjusts these rates downward to account for the decline in admissions, still finds significant effects both years. For both studies, home health discharges appear to come at the expense of discharges to home/self-care. Long, Chesney, et al. (1987)--who found a slight increase in the proportion of discharges to SNFs after PPS--find a "sharp" increase in the proportion of discharges to home health in 1984, accompanied by slight decreases in discharges to home/self-care and in discharges dead. By contrast, only two studies conclude that discharges to home health were only modestly affected by PPS, while discharges to SNFs were more substantially affected: Morrisey, Sloan, and Valvona (1988a) and Mayer-Oakes, Oye, et al. (1988), both of which were of select populations (see our discussion of discharge rates to nursing homes, above). All of the other studies reviewed found that the proportion of discharges to home health agencies had increased. However, none of the large-area, large-sample studies uses data covering the period when HCFA payment instructions apparently had a substantial effect on utilization of Medicare-covered home health services. We thus are left with only simple statistics on aggregated utilization for later years, as are reported by ProPAC and others.

The available data suggest that PPS was paralleled by an increase in the rate of discharges to home health agencies, as expected. This data may be somewhat more reliable than the data on nursing home discharges, given that Medicare is the largest single payer for home health services--although, even with home health services, Medicare pays for less than one-half of the total (Russell, 1989). But even if we take as given that patients were being discharged more frequently to home health services, there is so much change in the surrounding framework of home health coverage and payment policy and so much growth in the number of providers over time that any inference that PPS prpximately caused the change is problematic. We could more easily credit PPS with this result if the discharge rate to all forms of post-hospital, sub-acute care had increased systematically or if policies other than PPS had not had such substantial effects.

2. Severity of Illness for Patients Discharged to Sub-Acute Care

The discussion to this point concludes that there is evidence of an increase in the rate of discharges to some post-hospital locations and for some conditions, but that the evidence of increases is not overwhelming across all forms of post-hospital care, nor is it clear that PPS caused such increases as we observe. A second question to ask about post-hospital care turns the issue around: rather than asking about the proportion of hospital discharges to different post-hospital locations, this question asks about changes in the composition of Medicare patients admitted to sub-acute care after PPS. The logic here is intuitive: whether or not hospital discharges to sub-acute care are more frequent, if the patients discharged are sicker, there will be some confirmation that PPS has changed the division of labor within the health care system--with post-hospital care picking up some of the recuperation time and rehabilitation functions that were performed more completely in hospitals before PPS.

Studies of the severity of illness of patients in post-hospital care vary in methodological rigor. Moreover, most of the studies are based on local samples for a small set of post-hospital providers (usually nursing homes). Not surprisingly, the findings from the studies are not uniform. One study is based on a national sample of Medicare patients in all 50 states for all the years from 1981-1985 (Sager, Easterling, et al., 1989). Sager and his colleagues find that PPS was coincident with a statistically significant shift in the location of death, from hospitals to nursing homes. This shift could be plausibly ascribed to PPS, since 1) the pre-PPS trend in the proportion of deaths in nursing homes was stable; 2) the shift did not occur in waiver states in 1984-1985; and 3) the shift was greatest in states with the largest reduction in length of stay between 1983 and 1984. As Russell (1989, p. 40) notes, "This finding [by Sager et al.] stands out as one of the clearest signs that prospective payment has changed the kinds of patients being received by nursing homes, even as it has not had much effect on their numbers." The findings of an earlier analysis by Sager and his colleagues (1987) that focused exclusively on Wisconsin nursing homes for the years 1982-1984 are consistent with the larger, national study. So, too, is the study by Lyles (1986) of 78 nursing homes in the Portland, Oregon, area, for fiscal years 1982-1984; Lyles found only an insignificant increase in facility adjusted deaths from 1982-1983, but a large, significant increase in 1984, thus suggesting that the mix of patients had changed in 1984 when PPS was introduced. Carroll and Erwin (1990) examined Medicare admissions to seven long-term care facilities in the Philadelphia area for two year-long periods beginning in mid-1982 and mid-1985; they found insignificant differences in 30-day mortality, but the post-PPS cohort showed more complex health status (e.g., they were more likely to be readmitted to the hospital and to be incontinent of bowel and bladder, while they were less likely to be ambulatory) and evidence of different, more costly drug use.[33]

Two large sample studies reach different results. The RAND study of the quality of care under PPS reviewed a national sample of Medicare patient records for five different diseases for the years 1981-1982 and 1985-1986. The study found that there was no significant increase in the instability of patients at hospital discharge, for the cohort of patients discharged to institutions (Kosecoff, Kahn, et al., 1990). Manton, Vertrees, and Wrigley (1990) compare results of the 1982 and 1984 National Long Term Care Survey and find that the mortality rate in SNFs and the admissions rate from SNFs to hospitals declined. A number of other, small-sample studies have reached similar results. Carroll and Erwin (1987) examined medical records of patients admitted to 10 long-term care facilities in Georgia in the second half of 1982 and of 1984. Their results show some increases in severity in the later cohort--1984 patients were more likely to be incontinent of bladder, to have nasogastric tubes, and to be on dietary supplements; but the percentages dying or readmitted to the hospital fell, while other diagnosis, treatment, and health status variables showed no change. Rogers (1989) examined client records for a single home health agency in the first half of 1983 and 1984 and found some evidence of an increase in needs (e.g., physical therapy and restorative nursing care) coincident with PPS, although the results were not uniform and were possibly confounded by anticipatory changes in practice patterns by the agency. Sandall and Massey (1989) examined patient records for one home health agency and five extended-care facilities during certain periods of 1982, 1984, and 1986; they found that, in terms of relatively simple measures of the complexity of patient health status, there were no

[33]The data in Carroll and Erwin (1990) on the increased seriousness of diagnoses at admissions after PPS are consistent with their other findings, but may be complicated by the reliability of the coding of diagnoses.

changes in the extended-care group, although there were significant changes in the home health group. Lewis, Leake, et al. (1987) examined medical records for Medicare patients in a set of Southern California nursing homes, for the years 1980, 1982-1983, and 1984; they found that most of the time-related changes in functional status, diagnosis, and outcomes occurred in 1982-1983, before PPS.

The 1987 study of Lewis, Leake, et al. provides an important caution, emphasized by Russell (1989): studies with pre-PPS data too removed in time from the first year of PPS may fail to pick up changes that occurred in the (undocumented) intervening years. As a result, such studies may falsely attribute the results they observe to the effect of PPS (e.g., consider if Lewis and her colleagues had only had data for 1980 and 1984).[34] At the same time, studies that have only one pre-PPS cohort (even a cohort immediately before PPS) may mistakenly attribute any significant change in the PPS year to PPS, even though the change may be accounted for by the time trend prior to PPS--something that cannot be estimated with only one pre-PPS cohort. Finally, a similar logic applies to studies with only one post-PPS cohort: with only one post-PPS cohort, there is no way to test whether results for the single year signify a trend or a less portentious fluctuation. Of all the studies discussed above concerning the severity of admissions to post-hospital care, only one study avoids all three problems: the 1989 study by Sager and his colleagues has four pre-PPS years and two post-PPS years in a continuous national data series from 1980 through 1985. As noted earlier, this study finds a significant shift in the location of death from hospitals to nursing homes, in part by exploiting the analytic leverage its more extended sample permits.

Overall, then, this literature reaches conflicting findings using data that typically are limited in time, even as most of the studies are limited to local areas and small samples. The most tenable conclusion from this research is that there does appear to have been some change in post-hospital admission patterns, but the change is not so large or consistent as to emerge from all samples or from all measures of severity.

All of these studies are based on patient-level data. A second set of studies changes the focus, from the characteristics of patients to the beliefs of providers, in an effort to find out (through surveys or interviews) whether nursing home staff and others see changes in patients and practice with the advent of PPS. Most of these studies find respondents reporting an increase in the severity of patient conditions or the complexity of patient service needs under PPS (e.g., Binney, Estes, and Ingman, 1990; Goldberg and Estes, 1990; Lyles, 1986; Swan, Torre, and Steinhart, 1990; and Wood and Estes, 1990). As Russell (1989) emphasizes, most of these surveys have been run in the post-PPS era, making the pre-PPS baseline uncertain. But the studies do provide an impressionistic sketch of nursing homes taking on a different role in the wake of (if not necessarily caused by) PPS. These studies lend some credence to the proposition

[34]This problem limits what can be inferred from a second study by Lewis and others (1990). This study measures functional characteristics and other traits of 1980 and 1984 cohorts of patients readmitted to a sample of Southern California nursing homes. While the study finds the 1984 cohort more disabled, more debilitated, and less likely to return home, the absence of an interim cohort between 1980 and 1984 makes it impossible to attribute the difference to PPS, as the authors recognize.

that important changes have occurred, even if the patient-level studies reveal such changes only part of the time.

3. Post-Hospital Care: Conclusion

The studies on post-hospital care reviewed in this section do not provide a succinct or unambiguous set of findings: there is evidence of the expected effects of PPS, but not in any simple or uncontradicted way. The rate of discharges to nursing homes did not clearly increase, but the mix of patients and the complexity of treatment needs may have became more severe with PPS. The rate of discharges to home health care likely increased on average, and the intensity of home health care may have increased as well. This somewhat muddled picture suggests that some pre-PPS functions of the hospital may indeed have been moved to post-hospital care, but not with the strength or consistency we have seen in reviewing other PPS effects (e.g., on issues like length of stay). This qualified set of results is perhaps inevitable, given the peculiar data difficulties that analyses of post-hospital practice patterns present. But it is also inevitable given the surrounding changes in Medicare policy--as well as the policies of other payers and influences independent of PPS--that confound easy causal attribution even when effects coincident with PPS are found.

D. Effects on Exempt Hospitals and Units

Our review of the effects of PPS on practice patterns concludes with a review of one last set of institutions: exempt hospitals and units. PPS does not cover all types of hospitals: psychiatric, rehabilitation, children's, and long-term care hospitals are exempt. Nor does PPS cover all Medicare discharges from hospitals that are covered by PPS: qualifying psychiatric and rehabilitation units in acute care hospitals are exempt. Alcohol and drug abuse hospitals and units were also exempt when PPS was first introduced, but they were brought under PPS in fiscal year 1988. Exempt hospitals and units are paid under TEFRA methodologies, which reimburse for reasonable charges, subject to limits on the rate of increase each year.

The presence of hospitals and units exempt from PPS creates potential opportunities for diversion or transfer of patients to the exempt, charge-based environment--the expectation being that PPS would increase admissions to exempt facilities, particularly admissions of notably costly (e.g., potentially long-stay) patients. Given the possible value of the exemption, there is an expectation as well that qualifying units--especially those likely to sufffer financially under PPS--will seek exempt status.[35] Against these expectations, the literature presents a mixed picture.

[35]In principle, exempt status was not a matter of choice: exemption was to be granted to all units that met HCFA's qualifying conditions. But the actual exemption process was quite complicated. In some cases, it was initiated by the hospital; in other cases, Medicare intermediaries identified the units to which an exemption should be granted (Lave, Frank, et al. 1988a). In any event, "Since providers could control whether a number of the qualifying conditions were in place, it is likely that they had some choice about their exemption status" (Ibid., p. 166).

1. Number of Exempt Facilities

The number of exempt units and hospitals has grown, but not uniformly. The most conspicuous growth is in rehabilitation hospitals (increasing nearly 150% in the period 1984-1989) and rehabilitation units (increasing over 100% in the period 1984-1989).[36] Psychiatric hospitals and units increased by half over the same period. Growth in long-term and children's hospitals was much smaller by comparison (ProPAC, 1990; see also Hatten and Gibson, 1987).

2. Number of Exempt Admissions or Discharges

The number of discharges from exempt hospitals and units also increased after PPS (ProPAC, 1990). Discharges from exempt psychiatric hospitals increased 35% from 1984-1989, while discharges from exempt psychiatric units increased 123%. Discharges from exempt rehabilitation hospitals increased 41% from 1984-1989, while discharges from exempt rehabilitation units increased 136% over the same period. Discharges from long-term care hospitals actually declined over this period, while the very small number of discharges from children's hospitals increased by half. Thus, the important increases in exempt discharges appears to have occurred in psychiatric and rehabilitation facilities.

These simple statistics suggest the following propositions:

-- For psychiatric and rehabilitation services, there was some shift of admissions or discharges toward the exempt environment, given the sharp increase in these exempt discharges at a time when Medicare admissions generally were declining.

-- The greater increase in discharge volume from exempt units, versus exempt hospitals, may be evidence of the plausible proposition that hospitals have more fluid substitution possibilities for exempt units under their control.

3. Exempt Hospital Reimbursement

Reimbursement to specialty (exempt) hospitals did not change much with the introduction of PPS: in each year from 1980-1983, specialty hospital reimbursement was 1.3% of all Medicare inpatient hospital reimbursements; for 1984-1985, the percentage increased only slightly, to 1.4% each year (Helbing and Latta, 1988b). This simple statistic suggests that there was some stability in specialty hospital reimbursement, but it confounds price, volume, and case mix changes, for both specialty and non-specialty hospitals.

4. Other Effects: Rehabilitation, Long-Term Care, and Children's Facilities

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[36]The studies of exempt hospitals that use HCFA data files (e.g., the PATBILL file) typically do not include pre-PPS years, given the difficulty of identifying exempt facilities for pre-PPS years. Hence, most studies of exempt facilities cover years beginning in 1984.

The published literature on exempt facilities offers relatively little analysis of the effects of PPS on rehabilitation, long-term care, and children's facilities. One study of the impact of PPS on rehabilitation hospitals and units surveys rehabilitation workers in 1986 and finds a perceived increase in the severity of illness after PPS, but little change in length of stay (Heinemann, Billeter, and Betts, 1988). A study performed at a Rhode Island hospital (Parfenchuck, Parziale, et al., 1990) reviews the experience of a rehabilitation unit when it shifted to exempt status in 1987, having earlier been a non-exempt, acute-care stroke unit. The results generally comport with expectations of PPS. The shift to exemption was part of the hospital's search for ways to stem growing losses under PPS. Following the shift, the unit admitted more functionally impaired patients on average; at the same time, there were increases in occupancy (to 100%), length of stay, proportion of discharges home, and ambulation of patients on discharge. The authors conclude that exempt status permitted more efficient use of rehabilitation beds and an overall improvement in reimbursement to the hospital--results which apparently led in this case to the hospital's reclaiming some of the rehabilitation that, under PPS, had previously shifted to post-hospital care.

5. Other Effects: Psychiatric Facilities

While the published literature on most exempt facilities is rather small, there is a significant body of literature on psychiatric facilities. One article reports unpublished NIMH data on psychiatric hospitals, showing a slight decline in length of stay in private psychiatric hospitals and a more substantial decline in public psychiatric hospitals, from 1984 to 1985 (Jencks, Horgan, and Taube, 1987). Most other studies are focused on psychiatric units, detailing comparisons among exempt units, non-exempt units, and scatterbeds in short-term hospitals. The general findings: 1) based on descriptive information, admissions to exempt units increased somewhat after PPS, while admissions to non-exempt units and, particularly, scatterbeds decreased (DesHarnais, Wroblewski, and Schumacher, 1990[37]); 2) average length of stay decreased in all three types of units, with the largest decline in scatterbeds and the least decline in non-exempt units--a notable finding given the absence of any pre-PPS trend of decreasing length of stay for any of these types of units (Ibid.; Jencks, Horgan, and Taube, 1987; and Lave, Frank, et al., 1988b). Studies that focus on scatterbeds alone again find particularly large reductions in lengths of stay coincident with PPS for this type of unit and also find a notable LOS reduction in anticipation of PPS (Frank, Lave, et al., 1987; and Freiman, Ellis, and McGuire, 1989). One of these studies finds further that decreases in length of stay in the sampled CPHA hospitals applied to Blue Cross and private insurance patients as well as Medicare, thus suggesting that:

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[37]The study by DesHarnais, et al. found that the net effect of the increase in psychiatric admissions to hospitals with exempt units and the decreases in such admissions to hospitals with non-exempt units and scatterbeds net out to a small decrease in admissions overall. Most of the decline in admissions is due to a substantial decline in psychiatric admissions for patients aged 76 and older (there was little decrease overall in psychiatric admissions for younger Medicare patients). This finding could mean that older patients--with potentially longer stays and higher costs of treatment--were being diverted altogether from hospitals, with or without exempt units. We will have more to say on this issue when we discuss the work of Newhouse and Byrne (1988) later in this chapter (see Section D.7 below).

... some of the effects of PPS 'overflowed' to non-Medicare patients, or that Blue Cross and private insurers may have intensified utilization review during 1984-1987. Another possibility is that there were some changes in the treatment patterns of psychiatric patients during this time period, and these changes affected the treatment of all patients regardless of payment source. (DesHarnais, Wroblewski, and Schumacher, 1990, p. 386.)

Here again, then, the effects apparently coincident with PPS cannot be rigorously attributed to it, especially as the study in question was purely descriptive.

The nominal increase in exempt unit admissions conforms to expectations. Meanwhile, it is not surprising that scatterbed lengths of stay declined so substantially; but it is puzzling why lengths of stay would decline in exempt units--indeed, would decline more than in non-exempt units--given that the former are reimbursed for charges (albeit subject to some limits), while the latter are under PPS. The broad trend of reduced length of stay may be evidence of a generalized change in practice patterns, prompted to some degree by PPS but not limited to the boundaries of PPS reimbursement. As to the small decline in non-exempt length of stay compared to exempt length of stay, the best available explanation has been offered by Frank, Lave, et al. (1987). These authors emphasize that exempt/non-exempt status is a variable that hospitals can to some degree control, so that non-exempt facilities under PPS will tend to be facilities that will suffer the least under PPS. The findings of Lave, Frank, et al. (1988a) corroborate this point: they find that psychiatric units expected to profit from the change to PPS were least likely to obtain an exemption. Non-exempt units under PPS thus would tend to be under relatively little financial pressure--rather than systematically under more financial pressure--and to do less to reduce lengths of stay.

6. <u>Severity of Conditions in Exempt Facilities</u>

It may be true that there have been important changes in the severity of patient conditions in exempt institutions after PPS; but no published study of which we are aware measures or controls for severity beyond use of DRG classifications. The studies find evidence of slight increases in severity on this basis, which may indicate upcoding, more difficult patients, or both (e.g., Frank, Lave, et al., 1987).

7. <u>A Contradictory Finding</u>

One study raises a question about the findings of the other literature in this area. As noted in our earlier discussion of inpatient hospital lengths of stay (see Section A.2 of this chapter), Newhouse and Byrne (1988) measure lengths of stay for all Medicare patients, not only patients in short-term acute hospitals. They find average length of stay for all Medicare patients to have increased in fiscal year 1984 versus fiscal year 1981, although they find that stays <u>exclusively in hospitals and units governed by PPS</u> did decline in 1984, as the overwhelming consensus of the literature suggests. Based on suggestive data provided by the authors, it appears that the increase in LOS overall in fiscal year 1984 may be due to an increase in the proportion of patients in all hospitals with extremely long lengths of stay--from 1981 to 1984, there was a one percentage

point increase in the proportion of all patients with a length of stay over 60 days (average stay for this group: 130 days).[38] Other things being equal, this increase in extremely long stays could only occur in exempt hospitals and units, since the length of stay for PPS-governed hospitals and units decreased in 1984.[39] The problem: while no published study analyzes data on lengths of stay across all exempt facilities, there is no suggestion anywhere in the literature that average length of stay increased for any important group of exempt facilities in 1984. In fact, the published studies show decreases in length of stay in 1984 in those exempt facilities (e.g., psychiatric units) for which published studies are available. All of the increase may have been concentrated in areas (e.g., rehabilitation facilities) not rigorously analyzed in the published literature. Otherwise, it would be difficult to reconcile Newhouse and Byrne with the balance of the literature, especially as no published study of which we are aware has specifically followed up on the challenge Newhouse and Byrne raise.[40]

8. The Effects of PPS on Exempt Facilities: Conclusion

The published literature reviewed above suggests that an increase in exempt facilities and at least some of the expected increase in admissions to exempt facilities did occur when PPS was implemented. At the same time, an unexpected decline in lengths of stay occurred in some exempt facilities (notwithstanding charge-based reimbursement in those facilities), although there is some question as to whether PPS was responsible and a question as well about what happened to lengths of stay across all exempt facilities in fiscal year 1984. Thus, the literature is not so comprehensive as to permit strong conclusions for exempt facilities generally. It shows some of what we expect to see, but reveals some surprises and leaves certain important gaps. One important caution this literature suggests--a caution worth keeping in mind for all studies of PPS practice patterns, not just those studies of exempt facilities--is that "PPS incentives" are not as simple as many of the original, straightforward inferences. Psychiatric units did not move in lockstep to exempt status when PPS was implemented: some units were winners, not losers, under PPS, and appear in fact to have had little incentive to avoid (or to change practice patterns under) the new system. Moreover, various units were winners or losers in ways that, while little studied, likely have changed over time.[41] The availability of exemptions may have had an

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[38]Mathematically, a one percentage point increase in these extremely long stays is sufficient to increase overall length of stay by more than one day, thus accounting for virtually all of the LOS increase from 1981 to 1984 that Newhouse and Byrne detect.

[39]That is, if LOS for <u>all</u> elderly Medicare patients increased in 1984 due to an increase in extremely long stays, while LOS for hospitals and units governed by PPS decreased, then the extremely long stays would have had to occur in exempt facilities--and would have to have increased LOS for the relatively small proportion of exempt admissions even more substantially than it increased overall LOS.

[40]DesHarnais, Wroblewski, and Schumacher (1990) found a substantial decline in psychiatric admissions of older patients to CPHA hospitals. One explanation, following Newhouse and Byrne, is that these older patients were admitted instead to exempt psychiatric hospitals for longer hospital stays, with a possible increase in cost to the Medicare program. However, the CPHA data available to DesHarnais et al. do not permit a test of the hypothesis.

[41]For example, the most recent report of PROPAC (PROPAC, 1991) offers evidence that the profitability of exempt status for hospitals and distinct-part units has declined over time (see discussion at pp. 101ff).

important effect on how individual facilities adjusted to PPS, but does not appear to have wrought a major or fundamental change in the division of labor between short-term acute hospitals and these specialty facilities.

E. The Effects of PPS on Practice Patterns: Conclusion

We have reviewed the literature on the effects of PPS on practice patterns across the principal groups of health care providers reimbursed by Medicare. With some abstraction from the welter of detail, it will be useful at this point to bring into focus the revised contours of health care practice following PPS. In doing so, we should emphasize again the data limitations that constrain the studies in this, as other, areas of health care research. We should also emphasize that the published literature to date includes simple statistics through 1988 or 1989, but few detailed econometric studies for data beyond 1986. As a result, what the literature lets us know about the effects of PPS on practice patterns is in important ways confined to the first three years of PPS--and can tell us little about all that has happened in the five subsequent years that are not well studied. At the same time, even for the early years, it is generally difficult to attribute the changes associated with PPS implementation to the PPS intervention--most studies do not control for a whole array of confounding variables, and for some areas (e.g., post-hospital care) the confounding effects of other variables clearly are not hypothetical. But granting all of these limitations, it is clear that something began to happen in late 1983 to the customary practice patterns for Medicare patients. Leaving aside the complexities, we will sketch in this section what the most important changes were that at least accompanied the implementation of PPS.

As expected, PPS appears to have been associated with a substantial, albeit one-time, reduction in lengths of stay--across the board, for hospitals, diagnoses, and age groups of all kinds, and even for admissions to the subset of exempt facilities documented in the literature. As expected, this reduction in length of stay was accompanied by somewhat less intense care within the shortened hospital stay. Contrary to expectations, hospitals did not compensate for reimbursement limitations by increasing the rates of inpatient admissions: admissions rates in the early years of PPS appear to have declined, for reasons that are not well documented. For those patients continuing to be admitted, case mix indices increased substantially, with major reimbursement implications; these patients were probably more severely ill on average, although the evidence on this point is limited and somewhat conflicting.

These large changes raise questions about what happened to the patients who, prior to PPS, were treated in the hospital, but now are not--or who continue to be admitted, but are now treated less intensely on average, for a shorter period. Since there are no comprehensive studies of pre- and post-PPS episodes, we can only infer what has happened from studies of more aggregated trends. Apparently, some of these patients formerly admitted to hospitals were simply shifted to outpatient surgery and treatment, another of the large and expected shifts from PPS; or (to a lesser degree) these patients were shifted to exempt facilities. Some of the patients continuing to be admitted to inpatient settings had some of their care shifted to outpatient settings prior to admission (although the evidence here is not very precise) and some of their care to specialized post-hospital providers. But the expected shift to post-hospital care was not large and systematic--SNFs and home health care may be receiving sicker patients and performing some of the role

formerly performed by hospitals, but the rates of discharge to SNFs in particular have not dramatically increased.

Taking this literature as a whole, and particularly the failure to find large increases in post-hospital care and care in exempt facilities, it is difficult to avoid the impression that some of the care delivered before PPS is no longer being delivered. None of the studies of particular pieces of the whole system can address this issue; and a review of that literature cannot claim to have developed a precise answer. But in the absence of more comprehensive pre/post studies of patient episodes from start to finish--which, given data difficulties alone, would be a Herculean task--it is important at least to offer the hypothesis that some of the care has disappeared from the formal system, to be replaced by informal caregivers or not to be replaced at all. PPS was premised, among other things, on the proposition that there was an important amount of slack in the system. Given the difficulty of documenting a clear substitution for the care no longer given in the short-term acute setting, the likelihood increases that some of the services performed previously are no longer being performed by anyone in the formal system.

Given this set of conclusions about the effects of PPS on practice patterns, what are the implications? Did Medicare save money? Whether or not Medicare saved money, has the health care industry suffered, in terms of declining progress or shifts of Medicare costs to other payers? Most important, was the quality of care received by beneficiaries reduced? In the sections that follow, we turn to questions about these implications of prospective payment.

CHAPTER III.

MEDICARE BENEFIT COSTS AND U.S. HEALTH CARE COSTS

Much of the political debate on PPS has revolved around likely changes in practice patterns and their implications for patient care. But PPS was prompted in the first instance by expectations that PPS incentives would contain the costs of Medicare benefits by controlling the costs of inpatient hospital coverage. The changes in practice patterns detailed in Section II above suggest the possibility of savings in inpatient hospital benefits, but the possibility as well that any savings may be offset by increases in the costs of other Part A and Part B benefits. In this section, we will review the literature on what the net effects of all these changes have been to the federal government, to Medicare beneficiaries, and to the U.S. health care system.

The literature on this subject fails to control for any coincident source of cost savings or growth, but reaches a consistent result: PPS is associated with a material reduction in overall Medicare benefit costs, but appears to have had little effect on the overall growth of U.S. health care expenditures. We can review this literature first by examining the trend in overall Medicare benefit payments. We then will review the changing composition of those payments and the associated changes over time in beneficiary liabilities. Finally, we will review the associated trends in overall U.S. health care expenditures. The findigs of this review are summarized in Table 5.

A. Total Medicare Benefit Payments

If Medicare spending (including Supplementary Medical Insurance, or SMI, premiums) is adjusted for inflation, enrollment, and changes in enrollee mix, the real growth in total Medicare spending has slowed somewhat. The annual growth rate in adjusted spending fell from 6.9% in the period 1980-1984 to 4.0% in the period 1984-1987 (Long and Welch, 1988). Guterman, Eggers, et al. (1988) report a similar decline in the real growth in total Medicare benefit payments: apparently adjusting only for inflation, these authors report a 5.9% rate of real growth in the first three years of PPS, compared to a 7.6% rate of growth in the years immediately preceding TEFRA. Beneath this overall decline lay historically low growth in inpatient hospital benefits--for example, the 4.6% increase in inpatient hospital benefit payments in fiscal year 1986 was the smallest increase in the history of the Medicare program (Guterman, Eggers, et al., 1988). The reduced growth in inpatient hospital payments was only partially offset by increases in outpatient hospital, skilled nursing, home health, and physician payment increases.

These studies compare annual rates of growth before and after PPS. One study (Russell and Manning, 1989) provides a cumulative measure of the change in spending levels. These authors analyze 10 successive reports of the trustees of the federal Hospital Insurance Trust Fund, to establish projected expenditures against which to measure the actual expenditures subsequently incurred. Russell and Manning make adjustments to correct for differing assumptions about inflation and admissions in each report. They find that PPS reduced Hospital Insurance Trust Fund expenditures by approximately 20% in 1990, approximately one-third of this reduction being

TABLE 5.

SUMMARY OF THE EFFECTS OF PPS:
EFFECTS ON THE HEALTH CARE INDUSTRY, MEDICARE EXPENDITURES, AND MEDICARE BENEFICIARIES

AREA OF EFFECT	PRINCIPAL FINDING	SECONDARY FINDINGS	IMPORTANT INDUSTRY DIFFERENCES
HEALTH CARE INDUSTRY			
•Cost Shifting	Only minor evidence of cost shifting.	"Spillover" utilization reductions from PPS a potential offset to price increases from any cost shifting.	
•Technology Diffusion	No large or systematic reduction in technology diffusion.	Evidence of negative effects in a few cases (e.g., cochlear implants).	
•Hospital Specialization	Greater diversity in some terms (number of hospitals offering particular services), but slightly greater specialization in other terms (relative volumes of services).	Specialization increases associated with lower hospital costs. Specialization encouraged by PPS incentives.	
•Hospital Management	Org. culture more "businesslike," management techniques more sophisticated.	Tangible consequences of management changes unclear.	
•Clinical Research	No systematic study -- only anecdotal information.		
•Uncompensated Care	Evidence that PPS increased uncompensated care.		PPS rates generous to hospitals with large uncompensated care load (e.g., teaching hospitals).
MEDICARE EXPENDITURES, BENEFICIARY LIABILITIES			
•Benefit Costs/ Beneficiary Liabilities	Substantial Trust Fund savings, only slightly offset by increase in SMI costs.	Average beneficiary liability increased slightly; beneficiary share of costs unchanged.	

Source: Coulam and Gaumer (1991).

attributable to declines in admissions rather than to the prospective rates themselves. Meanwhile, the authors find only a slight offsetting increase in SMI expenditures versus projections (the SMI increase is equivalent to only one percentage point of the 20% HI Trust Fund savings). The authors thus conclude that savings in hospital benefit costs were not simply shifted to other parts of the Medicare program, as the net savings remain substantial.

B. The Composition of Medicare Expenditures

PPS effects on overall Medicare benefit spending have been accompanied by a set of changes in the composition of benefit costs (ProPAC, 1989, 1991; see also Guterman, Eggers, et al., 1988; Latta and Keene, 1990; and Mitchell, Wedig, and Cromwell, 1989). Inpatient hospital benefits have steadily declined, while outpatient hospital benefits have steadily increased, as a percent of total Medicare benefit costs. Other Part A expenses (principally, SNF and home health benefits) were a relatively constant proportion of the total, from pre-PPS years through the first five years of PPS. Beneath this stable proportion, home health expenses increased, while SNF expenses decreased, as a proportion of the total. However, the implementation of MCCA and the liberalization of Medicare payment rules in the late 1980s increased SNF expenditures dramatically, and home health expenditures to a lesser extent, so that by the end of the decade other Part A expenditures were a larger proportion of the total. Finally, payments to physician and other suppliers under Part B increased more than the pre-PPS or pre-TEFRA trend, although the physician payment freeze likely suppressed some of the reimbursement effects of the underlying increases in volume.

The variations in the composition of spending outlined above reflect changes in the relative rates of growth for the different components of Medicare benefit payments. In turn, these changes in rates of growth mirror the changes in practice patterns discussed in the previous section: declines in inpatient hospital care, mixed results for SNF and home health benefits (until MCCA and the liberalization of Medicare payment rules in the late 1980s), and increases in outpatient hospital and physician care. The net result is a reduction in overall Medicare spending, by comparison with the spending that would have occurred had the pre-PPS trends continued. The principal difficulty of interpreting this literature is establishing how much of the change in trend was caused by PPS, as opposed to a whole array of possible confounding factors.

C. Beneficiary Liabilities

Beneficiaries are liable for the applicable deductibles and coinsurance for Part A services, as well as for the deductible, coinsurance, premium, and any balance-billed amounts for Part B services. Given the availability of Medigap, Medicaid, and other supplementary insurance for the elderly population, these liabilities do not translate directly into out-of-pocket costs for individual beneficiaries. But there have been concerns that PPS would increase beneficiary liabilities for covered services, since PPS has caused or paralleled: 1) a shift away from inpatient hospital stays, toward other services (e.g., outpatient services) which tend to be less fully reimbursed; and 2) large increases in the hospital deductible and Part B premiums (Russell, 1989).

However, while the liabilities per enrollee increased rapidly after 1980, most of the real increase occurred prior to 1984--the increase from 1983 through 1987 was only 0.4%, as compared to 16.0% from 1980 through 1983 (ProPAC, 1988). Between 1980 and 1990, the beneficiaries' share of total Medicare liabilities increased only one percentage point, from 22% to 23% (ProPAC, 1991). One reason for the limited growth in beneficiary liabilities was that Congress directly and indirectly restrained potential sources of growth: e.g., by freezing physician fees, limiting Part B premium increases, reducing increases in the hospital deductible, and encouraging physicians to accept assignment (Russell, 1989). Examining data through 1987, Russell (Ibid., p. 77) concludes: "While out-of-pocket expenses continue to be a problem for many of the elderly, it does not appear that prospective payment has made the problem worse...." The MCCA legislation promised to reduce cases of extreme liability, but the repeal of the Medicare portions of MCCA eliminated this promise.

D. Total U.S. Health Care Expenditures

The question of whether PPS has reduced the growth in U.S. health care expenditures overall is impossibly large, since there is no practical way to control for all of the confounding influences that a careful answer would require. To our knowledge, there is no such careful answer in the published literature, employing at least crude control variables to attempt to isolate the effects of PPS. Instead, there are a number of studies that compare aggregate rates of growth for Medicare and non-Medicare (or overall) health care spending, using changes in relative rates of increase to support general inferences about the wider effects of PPS.

For example, ProPAC (1991) compares rates of growth in Medicare costs per enrollee to rates of growth in national per capita health care costs. In the 1970s, Medicare costs per enrollee grew at a faster rate than national costs per capita; in the 1980s, the relationship was reversed, leading ProPAC to conclude (p. 11) that "government cost containment was more effective than that of the private sector...." The responsibility of PPS for this result was suggested by the fact that most of the government's success came from slowing the rate of expenditure growth for Medicare hospital services, while Medicare physician expenditures increased faster than the national average increase in expenditures for physician services. However, notwithstanding the apparent improvement in Medicare's cost performance relative to private efforts, ProPAC conceded that cost containment efforts for all health care spending during the 1980s had had only modest success--reducing overall rates of increase by less than one percentage point in the mid-1980s, while rates of growth appeared to accelerate again in the late 1980s. Anderson and Erikson (1987) and Levit and Freeland (1988) reach similar conclusions based on similar analyses: they find success in the small for efforts to control Medicare inpatient hospital spending, but little ultimate success in controlling the overall growth in U.S. health care expenditures. However, the Levit and Freeland study develops one estimate that suggests public and private cost containment initiatives may have had a more significant effect on overall spending than implied by simpler, unadjusted comparisons. Using a model based on the relationship of health care spending growth to the inflation rate, these authors find that the observed rate of increase in health care spending (from 1983-1987) was almost two percentage points less than the expected rate. While this model is only one of many that might be conceived and estimated, the authors present it as a caution against concluding too readily that public and private initiatives had no effect.

These studies, and others like them,[42] control for little beyond the inflation rate and population (or enrollee) growth, leaving a vast distance between PPS and the overall spending totals that are measured. In the end, these studies are really about the growth of U.S. health care spending. They permit informed conjectures about whether the composite of all efforts to contain U.S. health care costs have been effective--leaving aside any rigorous specification of what is within that composite and how its elements influence the overall result. But they can say little about particular cost containment efforts, like PPS. (Indeed, particular cost containment efforts are in the nature of anecdotal information, adduced ad hoc to explain various changes in the trend of overall expenditures.)

If our goal is to measure the effects of PPS, it is probably better to focus on more limited, more readily modeled settings--e.g., on the Medicare program, on hospital practice patterns, or on post-hospital care--rather than to imagine that we can discern PPS effects from a vantage point (total U.S. health care spending) that so elaborately confounds what we would like to measure. The best we can say in these terms is that this literature fails to find any evidence suggesting that PPS has increased overall U.S. health care expenditures.[43] If anything, PPS has dampened overall spending growth.

But our goal may be different than simply to measure PPS effects. We may fairly ask whether the strategy that PPS embodies is a sound general strategy for all payers--not Medicare alone--to contain U.S. health care costs. On this score, the literature on PPS and U.S. health care costs raises a fundamental criticism: insofar as PPS can be characterized as being of a piece with major public and private efforts to control health care spending, this literature calls the general strategy into question. This literature review is not the place to engage the larger question of how to control U.S. health care costs, and the literature discussed above only hints at the potential limits of the strategies that public and private payers currently follow. Nevertheless, if we see PPS/PROs as consistent with the fragmented, payer-by-payer micromanagement of health care costs characteristic of current public and private initiatives, this literature supports a speculation as to whether more fundamental reform is needed--even if, standing alone, the direct and measurable effects of PPS point generally to the success of the PPS effort for the Medicare program.

E. The Effects of PPS on Costs: Conclusion

The main purpose of PPS was to control the growth of inpatient benefit costs, and it appears to have accomplished that end. The principal evidence for this accomplishment is the

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[42]In this section, we have discussed a few studies that directly address the question of PPS effects on overall U.S. health care spending. In turn, these studies are only a small part of the vast literature on the growth of U.S. health care costs. Studies in the latter category are generally beyond the scope of this literature review, except as specific issues about the effects of PPS are raised.

[43]One possibility not addressed in the discussion in the text is that PPS savings were obtained at the price of shifting Medicare costs to other payers. The cost-shifting issue will be treated in detail in Chapter IV, as part of our larger discussion of the effects of PPS on the health care industry.

clear reduction in historic rates of growth for inpatient hospital benefits and for total benefit costs, and the shortfall of actual hospital insurance fund payments against pre-PPS projections. The savings are substantial--on the order of 20% of what had been projected for 1990--and are only slightly offset by increases over projections in SMI fund payments. Meanwhile, the savings that have been achieved do not appear to have come at the direct expense of Medicare beneficiaries. Beneficiaries now pay more for their care, but the average increase under PPS has been small in real terms and constitutes roughly the same share of the total as before PPS.

These results raise three final issues. First, should these financial results be ascribed entirely to PPS? As noted, a substantial part of the savings (perhaps one-third) is connected to the admissions declines under PPS and not to prospective rates as such; and other factors than PPS may account for some of the remaining two-thirds: e.g., such factors as other Medicare policies (the physician fee freeze, restrictive SNF and home health payment policies, and others); the effect on practice patterns of the actions of other payers; changes in medical technology and practice; and so on. There is no simple way to discriminate among all of the different possible influences, particularly given the unusual ferment in health care finance and management in the 1980s. However, no one seriously argues that the contribution of PPS is small, since the most important PPS savings are centered on the inpatient hospital setting that was the direct target of PPS.

Second, since the literature is based on measures of large aggregates, such as inpatient hospital care and physician care, it sets up an accounting system for the financial effects of PPS that is misleading for some purposes. Reductions in such quantities as projected inpatient hospital expenditures and increases in such quantities as projected outpatient expenditures are appropriate measures of the changes in payments from major Medicare accounts. But these changes tell an incomplete story of exactly how PPS saves money for Medicare. Consider an episode of care that has been shifted in whole or part to a non-inpatient hospital setting (e.g., an outpatient setting) under PPS. Other things being equal, this shift will register as a reduction in inpatient hospital payments and an increase in SNF, home health, or outpatient payments. But Medicare has not saved the full amount of the inpatient reduction, since part of those savings are obtained by purchasing care in a non-inpatient hospital setting. By the same token, the added costs in non-inpatient settings are not Medicare cost increases, except to the extent that the non-inpatient hospital care is more expensive than the inpatient hospital care previously used. The ultimate point here is that providers are producing different products before and after PPS, and a more complete analysis of savings would permit us to identify sources of savings and loss at a finer level of detail than the major Medicare accounts.[44] For that more detailed analysis, we would need to be able to analyze Medicare payments per episode for comparable patient conditions before and after PPS. That kind of episode-based research is difficult and costly. Earlier in this

[44]Russell (1989) does develop estimates to factor out the influence of admissions changes on HI Trust Fund savings. This adjustment permits a more precise understanding of the source of reductions in inpatient hospital payments; however, the data do not permit any calculation of the costs of treatment in non-hospital settings for the admissions that have been diverted. The few studies using linked Part A and B files (e.g., Menke, 1990; and Mitchell, Wedig, and Cromwell, 1989) track Part B expenditures associated with pre- and post-PPS hospital episodes, but do not evaluate the Part A payments associated with those episodes.

review (see Chapter II), we suggested how episode-based research would help to fill important gaps in what we can understand about PPS effects on practice patterns. The same general argument applies here, in understanding changes in Medicare benefit costs.

Finally, while controlling costs was an important objective of PPS, there were serious concerns about precisely how those savings were achieved. Savings from greater efficiency--whereby beneficiaries received quality care more cost-effectively--were the main goal of PPS. However, there were fears that the savings might be achieved in less acceptable ways: by delivering lower quality care to Medicare beneficiaries, by reimbursing hospitals and other providers less completely and fairly, by shifting legitimate Medicare costs to other payers, and other ways having little to do with efficiency as such. For reasons described in the preceding paragraph, the literature on the effects of PPS on Medicare benefit costs does not permit a very detailed tracing of how PPS efficiencies were achieved, other than to suggest that inpatient payments were lower than expected, outpatient payments were somewhat higher than expected, and (until MCCA and other changes) post-hospital payments were more or less as projected. Our review of practice patterns in Chapter II yields a similar conclusion on utilization as this literature on payments.

The results on practice patterns and on benefit costs beg questions as to whether the fears of PPS have been realized. The decline in inpatient admissions may signal serious access and quality problems. The decline in expected hospital payments may be a clue to serious financial problems for hospitals and/or other payers under PPS. And so on. In the sections that follow, we review literature devoted to specific measures of whether PPS has had any of the detrimental effects that were most feared when the program was implemented.

CHAPTER IV.

THE HEALTH CARE INDUSTRY

PPS was designed primarily to change the economics of Medicare hospital reimbursement, with potential consequences as well for the utilization of non-hospital care by Medicare beneficiaries--non-hospital care outside the ambit of PPS reimbursement (e.g., outpatient care) or, in some cases, outside the ambit of Medicare reimbursement entirely (e.g., long-term nursing home stays). But the effects of PPS necessarily became more conjectural as the focus of analysis moved farther away from hospitals and Medicare beneficiaries. These more distant effects could have been significant: it was at least possible for PPS to shift health care costs to other payers, to promote specialization by hospitals, to retard the adoption of new health care technologies, to impede clinical research, to reduce funding for uncompensated care, or otherwise to affect important interests outside of Medicare in the U.S. health care system. As a public payer and as the system's largest single payer, Medicare had implicitly or explicitly served many of these interests in the past. But it was possible for PPS to benefit Medicare even as it harmed the system. At the same time, it was intrinsically difficult to predict what these more remote and indirect results would be.

This section of our review will examine published research on key effects of PPS on the U.S. health care industry. This research is not comprehensive and often inconclusive, as we will see. However, the ultimate implication of this literature is similar to findings of research on other PPS issues: the available evidence fails to confirm the most negative outcomes that were feared when PPS was implemented. Our discussion is divided into six sections. These sections will deal in turn with research on how PPS affected cost shifting among payers, the diffusion of new technologies, specialization by hospitals, characteristics of hospital management, the conduct of clinical research, and the provision of uncompensated care. The findings of this review are summarized in Table 5, above.

A. Cost Shifting Among Payers[45]

The intensified concern of employers and commercial payers with the extent and magnitude of cost shifting is relatively new. References to cross subsidies appeared in the trade press during the 1970s, but the matter was often treated as an annoyance rather than a threat. In the 1980s, the issue of cost shifting became more prominent: there appeared to be more provocation for hospitals to shift costs, as various major payers--including, but not limited to, Medicare--pursued cost containment efforts that had the effect of reducing what some patients paid for hospital care. As pricing differentials among payers became more prominent, it was commonly assumed that costs were being "shifted" to the payers that failed to obtain discounts. Certainly, that has been the conventional understanding in the trade press. In the subsections below, we will first review

[45]The discussion in this section is drawn directly from Schmitz and Olinger (1991), which provides a more comprehensive review of the literature on cost shifting before and after PPS.

what the trade press has suggested on the issue of cost shifting, then summarize the theoretical propositions and empirical findings of the academic literature.

1. The Trade Press

Virtually all of the trade press articles on cost shifting point to Medicare (and Medicaid) "shortfalls"--that is, the difference between hospital charges and public payers' reimbursement--as the force driving hospitals to shift costs. While the claims made in these articles are generally unsubstantiated and are not based on empirical analyses, the anecdotal evidence is indeed compelling. For example, one hospital claims a 25 percent "spread" in the payment received from private and public payers for a hypothetical surgical patient with a five-day stay (HIAA, 1983); and California hospitals report losses amounting to $700 million annually, based on Medicaid and Medicare combined paying 32 percent less than hospital charges (Burda, 1990).

The Health Insurance Association of America (HIAA) has been the industry's spokesperson on the perils of cost shifting since the early 1980s. The organization's first policy statement in 1982 (i.e., pre-dating PPS) claims that Medicare and Medicaid payment for hospital services fails to recognize certain necessary costs. Certain hospital expenses such as the costs associated with bad debts, charity care, education, and research are excluded from government reimbursement formulas (either federal or state). At the same time, discounts negotiated by Blue Cross, Health Maintenance Organizations (HMOs), other managed care plans, and large employers increasingly restrict the patients/payers to whom costs can be shifted to make up these Medicare/Medicaid shortfalls. The consequences of cost shifting as reported in the trade press (e.g., Coddington, Keen, and Moore, 1991) are dire:

- cost shifting adds 25 percent or more to the cost of indemnity coverage and is virtually pricing this insurance option out of the market in some areas of the country;
- cost shifting was responsible for one third of the health plan premium increases in 1988; and
- cost shifting is a major culprit behind the large and growing number of uninsured Americans, since escalating premiums make it difficult for more people to afford any type of insurance.

Other adverse consequences of cost shifting are also alleged in the trade press: cost shifting sets different payers against each other, making systemwide cost containment virtually impossible; the ability of large employers to negotiate hospital discounts, at the expense of smaller employers who cannot, adds to cost shifting and creates adversaries among different sized companies in private industry; and cost shifting restricts competition in the health care marketplace (HIAA, 1983).

Cost shifting makes the zero sum game of paying for hospital costs absolutely explicit. The trade press claims that when employers or payers (including public payers) manage care and command or negotiate discounts for their own benefit, hospitals must raise their charges to try to

recoup these losses from other payers. In effect, this cost-shifting becomes a "hidden tax" on unprotected private payers (HIAA, 1982). Several trade articles present employers' and indemnity insurers' arguments in favor of all-payer systems, with or without rate regulation, so that hospitals are forced to deal with all payers on an equal basis. Proponents of all payer systems claim that this approach would end the cost shifting game (HIAA, 1983; Burda, 1990; Coddington, Keen, and Moore, 1991).

2. Theoretical Literature

A more complicated model of cost shifting comes from the academic literature. This literature has provided some specialized treatments of price determination in the market for hospital services. The most important works bearing on the cost shifting issue are those of Hay (1983), Foster (1985), and Dranove (1988). Each of these authors develops one or more economic models of price determination under alternative assumptions about the structure of the hospital market and the objectives of hospitals. Together, these investigations lead to five important propositions for considering questions of cost shifting:

1. A hospital with no market power will not cost shift; and a payer with no market power will not be able to offer less than the market price--A firm with no market power (otherwise termed a perfectly competitive firm) would be unable to raise its prices to some buyers, since the firm faces a horizontal demand curve for its services. No buyer offering less than the market price would find a willing seller, since all firms (hospitals) are capable of selling whatever quantity of services they wish at this price.[46] Of course, this proposition assumes that payers have no monopsony power and that hospitals have no monopoly power. Relaxing those assumptions leads to the propositions below.

2. Profit-maximizing hospitals with some market power may charge different prices to different payers--A hospital with some market power to change prices may wish to exploit differences in the sensitivity of different payers to price changes in order to maximize profits. What results is ordinary price discrimination. The price-discriminating hospital will always charge a higher price to that set of payers that is least sensitive to price (that is, the payers who exhibit the lowest elasticity of demand). Under price discrimination, the difference in prices charged to the two groups has nothing to do with cost shifting. It is for this reason that price differences by payer cannot be used to infer that cost shifting occurs.

3. Payers with some monopsony power may demand lower prices --Price differentials may be induced by the action of a payer who covers a significant fraction of the hospital's caseload and without whom the hospital presumably could not survive or

[46] This proposition assumes that there are no systematic differences in the costs to treat individuals covered by different payers. However, cost-based differences in price are not the kind of differences that give rise to claims of cost shifting in the trade press or the academic literature.

stay in business.[47] Under classical assumptions of perfect competition this could not occur, since payers offering less than the market price would find themselves excluded from the market, as noted above. The cost shifting literature, as a result, emphasizes the presumed exercise of monopsony power by certain payers as a necessary element in payment reductions.

4. Profit-maximizing hospitals will not cost shift--This proposition is often resisted in popular discussions of cost shifting, since it appears natural that a profit-maximizing firm would try to offset a price reduction negotiated by one payer by raising the price charged to other payers. The key here is that a profit-maximizing firm has already set prices to each payer at their profit-maximizing level. Therefore, raising the price charged to a given payer will reduce rather than increase profit.

5. Hospitals that do not maximize profits may cost shift--The utility function of hospital decision makers may contain as arguments not only profit, but also the quantity of care provided to different groups. If so, then the hospital may indeed respond to an exogenous reduction in the price received for care offered to one group by raising the price of care offered to the other group (Dranove, 1988). Note that this result could not be obtained if the hospital were already charging this second group a profit-maximizing price.

The basic implication of this theoretical work is that "cost shifting" reflects a set of fairly special circumstances and certainly does not describe all cases of price differentials. Price differentials may occur when either the payer or the hospital have sufficient market power. As a result, the differentials may reflect hospitals exploiting their market power: what is notable in these price differentials is not so much how low the price is to some payers (as the trade press emphasizes) but how high the price is to others. In other cases, the differentials may reflect behavior more akin to the cost shifting rationales in the trade press: major payers exercising their market power. But even in this latter case, the hospital must be pursuing other objectives than profit and have previously been charging less than a conventional market (profit maximizing) price, in order rationally to shift costs. Obviously, the possible combinations of hospital and payer behavior between these two polar extremes are infinite, with a complex set of possible results.

3. Empirical Findings

One implication of the theoretical work outlined above is that--for cost shifting to exist--decreases in Medicare or Medicaid payment should be accompanied systematically by increases in prices other payers must pay. We have reviewed the relatively limited empirical literature on

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[47]The sources of a payer's market power for hospital care may be relatively unconventional. For example, beneficiaries covered by some payers (e.g., Medicaid) may be difficult for the hospital to refuse to serve--regardless of the payment offered, within reason--due to requirements of licensure, the constraints imposed by prior acceptance of Hill-Burton funds, and other legal requirements.

cost shifting, omitting only those studies that address pre-PPS years exclusively.[48] The net implication of this work is that the rigorous evidence for cost shifting is limited.

Perhaps the most revealing evidence on the effects of PPS on cost shifting is an HIAA-sponsored study which HIAA has refused to release (see discussion in Morrisey and Sloan, 1989). The study was conducted by noted economists and reached conclusions that contradicted the common trade view: the study concluded that a hospital's burden of Medicare and Medicaid patients is not systematically associated with the amount of any cost shifting that takes place. This study found that hospitals with fewer Medicare patients raised their charges more to other payers than hospitals with more Medicare patients. In fact, PPS payments had the effect of lowering hospital prices charged to privately insured patients--rather than raising prices as the prevalent trade view of cost shifting would predict.

Three other analyses of cost shifting in the wake of PPS have been published (Morrisey, Sloan, and Valvona, 1988b; Morrisey and Sloan, 1989; and Hadley and Zuckerman, 1990), and they reach contradictory conclusions. The study by Morrisey, Sloan, and Valvona examines AHA Annual Survey data for the years 1976-1985. The study focuses on total hospital revenues, for Medicare as well as other patients, with the underlying premise being that complete cost shifting would result in a continued increase in revenue per capita for the hospitals. The study found that revenue per capita significantly decreased during PPS. The authors conclude (p.217) that: "The results of the first two years of PPS suggest that rather than shift costs from one payer to another, PPS, in combination with PROs, has had the effect of reducing the rate of increase in health care costs per capita." We should note that, strictly speaking, this result applies to utilization changes as well as changes in price (the measure involved is total revenue per capita), so that more than cost shifting, as defined here, is implicated in the result.[49]

Two other published studies use measures that define cost shifting more narrowly and precisely. Both studies focus on the response of the commercial price per admission (measured by charges) to changes in hospitals' "profit" from Medicare, as estimated by linear regression models. Hadley and Zuckerman (1990), using AHA and Medicare Cost Report data from 1984 through 1987, conclude that there is no evidence to support the hypothesis of cost shifting due to Medicare. On the contrary, their results (like the pre-PPS results of Hadley and Feder (1985)) suggest that hospitals with the highest profit rates from PPS--or any other source--increase their charges to third party payers the most.

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[48]The omission of studies for the years prior to PPS does not change the basic results of our review. As with the studies of data for PPS years, most pre-PPS studies find no evidence of cost shifting (e.g., Hadley and Feder, 1985; Sloan and Becker, 1984; and Zuckerman, 1987), although some studies do find evidence of slight shifts in costs (e.g., Dranove, 1988). See Schmitz and Olinger (1991) for a careful discussion of the complete set of pre- and post-PPS studies.

[49]Anderson and Erikson (1987) reach a similar conclusion based on a similarly aggregated comparison. These authors examined real rates of increase in Medicare spending and overall (Medicare and non-Medicare) spending for hospital services for the years 1980-1983 versus 1983-1986. They found that reductions in the rate of increase for Medicare spending during PPS were not offset by increases in the rate of increase for non-Medicare spending. This result suggested that PPS savings had not been offset by price and/or utilization changes for other payers--which leads the authors to conclude that cost shifting had not intensified under PPS.

By contrast, Morrisey and Sloan (1989), using data from the AHA Annual Survey for 1980 and 1983-1987, found evidence of cost shifting among urban hospitals as a result of PPS. Changes in profits resulting from PPS were estimated to have increased the private price in the 1984-87 period by a total of 18 percent. The results for rural hospitals (those located outside Metropolitan Statistical Areas) were different: these hospitals were estimated to have <u>lowered</u> their price to private patients by more than 14 percent as a result of PPS.

There is thus only limited, mixed evidence that PPS increased cost shifting. It is important to emphasize that--even if we embrace the view that PPS has increased the prices paid by other payers--that alone does not mean that PPS has increased the total costs of care for other payers. Effects of PPS on utilization--e.g., on admissions, lengths of stay, and other aspects of hospital utilization--may offset any price effects. For example, a widely cited, but unpublished, study of the effect of PPS on Blue Cross and Blue Shield plans (Scheffler, Gibbs, and Gurnick, 1988) shows that the net effects of PPS on BCBS were positive. The authors of this study examined data for 62 Blue Cross plans for the years 1980-1986 and concluded that PPS had saved money on inpatient and outpatient hospital expenses for plan enrollees. The primary source of the savings was a reduction in admissions that could not be explained by pre-PPS trends or by efforts of the plans to manage care and contain costs. The implication: changes in practice patterns wrought by PPS (and the PROs) were not restricted to Medicare patients; these changes apparently spilled over to other patients as well, suggesting that physicians tended to treat patients with similar presenting conditions in a similar way, regardless of payer. Given effects such as these, it is possible for PPS to have offset any price shifts to other payers with utilization reductions that leave the total costs of care little changed on balance.

4. <u>The Effects of PPS on Cost Shifting: Conclusion</u>

Numerous studies, both casual and rigorous, have suggested the existence of substantial price differentials across payers. In the absence of data to show that these price differentials are cost justified, many observers have concluded that hospitals are shifting costs, i.e. raising prices to some third-party payers to cover shortfalls from others. HIAA (1982) has referred to this cost shifting as a "hidden tax" on privately-insured individuals. Some authors have made striking claims--for example, Coddington, Keen, and Moore (1991) asserts that cost shifting account for one-third of the health plan premium increases in 1988. The allegation that cost shifting is a common phenomenon is the salient reason for the insurance industry's support for state all-payer systems.

This attitude, so pervasive in the trade press, is in stark contrast to the tone and results of most of the rigorous economic and empirical literature. The latter works emphasize that price differences by payer do not by themselves indicate cost shifting. Indeed, these price differences are equally consistent with profit-maximizing price discrimination by hospitals that have some degree of monopoly power. The academic literature emphasizes a fundamental point: in order to conclude that cost shifting has actually occurred, increases in fiscal stress or decreases in Medicare (or Medicaid) payment must be accompanied systematically by increases in prices paid by third parties.

In fact, available empirical studies of cost shifting after PPS suggest that cost shifting may not exist, or if it does, it does not apply to all hospitals. Moreover, even if PPS was associated with cost shifting (i.e., higher prices for other payers for at least some types of hospitals), there is also evidence that PPS helped to reduce utilization for other payers, thereby tending to offset the effects of any higher prices.

The studies published to date do not definitively dispose of the cost shifting issue--among other reasons, because the available data for empirical research (almost all of it from AHA surveys) are at times a crude match to the theoretical constructs one would most like to measure. Meanwhile, the concerns of the insurance industry and others make the cost shifting issue one that needs continuing investigation, if only to ensure that the results observed to date have not changed as hospital margins have declined. But based on the research done to date, industry anxieties about cost shifting appear excessive.

B. The Diffusion of New Technologies

The effects of PPS on the diffusion of new technologies are difficult to predict. Technologies that reduce cost can be assigned to DRGs that fully fund the technologies from the outset. For these cost-reducing possibilities, PPS should encourage expanding use.[50]

Cost-increasing technologies present a more complicated case. In principle, cost-increasing technologies can be assigned to newly created DRGs or to reweighted DRGs that cover their costs; or they can be assigned to existing DRGs that in due course will reflect their costs when the entire system of DRG weights is periodically recalibrated. However, HCFA has generally resisted creating new DRGs or performing case-by-case reweighting of existing DRGs. As a result, PPS generally will not fully cover the costs of new cost-increasing technologies assigned to existing DRGs during a transition period of expanding use. Meanwhile, although recalibration of existing DRGs may make particular DRGs more accommodating to a new technology, that result is not certain. As noted by Kane and Manoukian (1989, p. 1381):

> Recalibrations will not raise the DRG weights for a new technique until it is already well-integrated into the charge base. The new technology must represent a substantial proportion of the DRG cases in order to cause the average cost increase for the DRG to exceed the increases in other DRGs such that its relative weight changes.

Thus, for cost-increasing technologies assigned to existing DRGs, hospitals must fund losses on a new technology through an uncertain and potentially protracted diffusion period, at the end of which the marginal disincentive will ease only so far as the relative weight of the DRG increases during periodic recalibrations.

PPS does provide two specific accommodations to the expanding use of technology. First, with all capital costs, the capital costs of new technologies are exempted from PPS. As a result,

[50]It is possible, however, that PPS has made hospitals more risk averse and, accordingly, less inclined to make major investments in new technology.

the principal disincentives that PPS might pose are for non-capital costs of new technologies. Second, PPS includes a generalized science-and-technology update factor, which is recommended by ProPAC and taken into account by the Secretary of HHS in determining the annual update factor for the PPS standardized amount. However, the benefit of this update factor is limited: while this factor affects the average sufficiency of DRG payments to a slight extent, it does not alter the marginal disincentive to adopt a cost-increasing technology within particular DRGs.

As a result, cost-increasing technologies will typically end up within existing DRGs that do not fully reflect their costs. To that extent, PPS is biased in favor of cost-decreasing technologies. This bias might be viewed as an appropriate shift in the market for health care technology. That is, it might be desirable to discourage technologies that increase costs, except when they show such clear superiority (e.g., in patient outcomes) that hospitals will feel compelled to adopt them--notwithstanding losses and uncertainties under PPS--in order to achieve other goals: e.g., to maintain market share or to reduce the risk of malpractice claims. At the same time, it is arguable that new technology is only one of many possible sources of within-DRG variations in costs. Note, for example, that in "heart failure and shock," the DRG with the highest volume in 1984, two-thirds of the 500,000 cases involved charges under $4,000, while 7% of all cases involved charges over $100,000 (cited in Kane and Manoukian, 1989). Clearly, there is some room within an average price system like PPS for technological sources of cost variation, along with all of the other sources of variation that PPS ignores.[51]

It is also clear, however, that marginal disincentives are not irrelevant; and particularly as hospital margins decline, money-losing alternatives are likely to face greater scrutiny. Rates of diffusion for new, cost-increasing technologies are thus likely to be more seriously affected. It is not clear (on this issue, as on others) whether hospitals will strike a socially optimal balance between investments in new technology and financial rewards. The question then becomes whether the published research reveals any particular pattern in the effects of PPS on the diffusion of new technology.[52]

[51]In some respects, hospital decisions to invest in new technology are not comparable to other sources of cost variation. For example, new technology may require major investments. For the risk averse hospital, these investments pose different problems than the risks posed in treating single patients. In addition, the short-term comparison of revenue and cost for a new piece of equipment or a new procedure may be more predictable than the lottery on patient-by-patient cost variations. To that extent, the disincentive for underfunded, cost-increasing technologies may be more explicitly anticipated and more readily avoided than other variations in the costs of patient treatment.

[52]In this review, we generally will leave aside the question of how PPS affects technological innovation, focusing instead on the question of how PPS affects the diffusion of technologies that have been developed. The question of technological innovation implicates considerations far beyond PPS, including tax and regulatory policies, public funding for research and development (outside public reimbursement for health care), and other factors. The underlying assumption we make in this review is that the effects of PPS on innovation will be minimal, insofar as PPS does not notably change the demand of hospitals for new technology. However, even if PPS is shown to have changed hospital adoption rates for new technology, questions will remain as to whether the changes reflect a better balance of costs and benefits--we cannot simply assume that the rates of adoption prior to (or in the absence of) PPS reflect socially optimal rates.

There is one particular difficulty in attempting to determine what these patterns might be: the absence of appropriate comparison groups, to establish a standard against which to contrast observed PPS rates of diffusion.[53] Pre-PPS periods--which provide the almost universal comparison data for studies of other PPS effects--are notably difficult to use in analyzing the introduction of new technologies. For some important new technologies (e.g., MRI scanners), there is little or no pre-PPS experience. For other technologies (e.g., CT scanners), the pre/post comparison of hospital acquisition of new technology is confounded by the temporal effect of accumulating knowledge, which changes hospital propensities independent of any reimbursement effects. Given these problems (and the difficulties of rigorously controlling for their influences), the studies in this area are entirely descriptive or qualitative, with no authoritative normative standard for appraising results.

1. Pre- versus Post-PPS Rates of Diffusion

Studies based on pre/post comparisons reach a divergent set of results. Some studies simply show the pre/post rates of adoption of new or expensive technologies. For example, ProPAC (1990) reviewed growth rates in the proportion of hospitals offering certain high technology services before and after PPS (from 1980 through 1987 or 1988, depending on the service). The services examined included cancer programs, cardiac catheterization laboratories, CT scanners, lithotripters, megavolt radiation therapy, MRIs, neonatal intensive care units, open-heart surgery, and organ transplants. Growth rates for some of these services increased after PPS, while growth rates for other services decreased. But in each case, the rates after PPS were positive, typically with little change from the pre-PPS period.[54] Moreover, for some particularly expensive technologies (e.g., MRI, CT, and lithotripsy), rates of adoption were higher in 1988 than 1987, suggesting that there is no simple declining trend in technology adoption as PPS margins erode.

Similarly, ProPAC (1988) studied the use of 28 expensive medical devices for treating patients in 29 DRGs in which there were arguable payment inequities in 1984. The list of devices studied included annuloplasty rings, bone grafts, cardiac valves and pacemakers, joint prostheses, penile prostheses, ventricular shunts, and others. The study found that, for 24 of the 29 DRGs, the percent of cases using the expensive devices increased between 1984 and 1986, notwithstanding that average operating margins were lower for device than for non-device cases within the DRGs and that these margins declined over the three-year period. In addition, the study found that a hospital's 1984 operating margin had little or no effect on its subsequent use of devices in 1986, even for devices (such as total joint prostheses and penile prostheses) that are often discretionary as a clinical matter. These data suggest PPS has had no "immediate, major effect" (p. 22) on the use of important technologies. The standard of comparison is in this case (as in the previous paragraph) a time trend of increasing use. What is important in these results

[53]Of course, as with studies of other PPS effects, there is no control group for studying how technological development would have proceeded in the absence of PPS.

[54]Two of the technologies (MRIs and lithotripters) were so new that there was no pre-PPS growth rate. For these two cases, the PROPAC data simply showed a positive rate after PPS.

is that the linkage over time of increasing utilization to declining profitability suggests that marginal reimbursement disincentives are being offset in utilization decisions by other (undocumented) considerations.[55] Sloan, Morrisey, and Valvona (1988d) reach more negative conclusions in their study of the application of various procedures to a sample of patients from CPHA hospitals for 1980 and 1983-1985. For example, these authors find substantial growth in the proportion of patients receiving CT scans after PPS, but the growth rates after PPS are slower than the rates before PPS.[56]

2. Why Do Hospitals Adopt Technologies That PPS Does Not Fully Fund?

The studies described above suggest that post-PPS diffusion rates for new technology may have declined in at least some cases, but not substantially. These results raise the issue of what considerations might be present for a hospital to override the marginal disincentives of PPS reimbursement that discourage adoption of at least some important technologies. There appear to be two principal considerations. First, new technology comprises a small proportion of overall inpatient costs for hospitals: less than one percent for each of the years studied by ProPAC (1990, 1991). Second, while the incremental contribution of new technologies to inpatient costs is small, these technologies may have a disproportionate influence on a hospital's competitive position and its ability to offer quality care. Steinberg, Stason, et al. (1988) surveyed a national sample of hospitals in 1986 to investigate adoption of MRI units. The sample was stratified to include all hospitals and other entities known to have adopted MRI units as of late 1985 ("adopters"), as well as a random sample all other U.S., non-psychiatric, acute care hospitals ("non-adopters"). Non-adopters of MRI units were deterred by a variety of considerations, including questions of clinical utility, the difficulty of obtaining a certificate of need, and fears of early obsolescence of the equipment. But economic considerations dominated the calculations. The three most important economic factors[57] were, in order, the high cost of MRI units, projections of insufficient patient volume to break even financially, and apprehensions about Medicare's PPS policies--the latter concerns being perhaps premature, given the major improvement in profitability of MRI units according to a later study the authors cite.[58] Given the responses of adopters, however, Steinberg et al. conclude (p. 270):

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[55]The question is begged, of course, as to whether this short-term linkage is sustainable over longer periods of time.

[56]Sloan and his colleagues also find that non-Medicare patterns of use tend to follow Medicare patterns--a result which suggests to these authors that the effects of PPS on practice patterns and technology use are not restricted to Medicare patients, but are being extended to hospital inpatients generally. To these authors, the most convincing explanation for this result is that physicians are able to practice only one style of medicine, and PPS is a sufficiently large change for a sufficient proportion of hospital patient volume to change that style.

[57]Relative importance is in this case determined by the proportion of non-adopters citing the factor as "important" or "very important."

[58]Evens and Evens, 1987.

Although Medicare's PPS may be slowing the diffusion of MR imaging equipment, other factors, reflecting increased competition in today's health care marketplace and the desire to provide the highest quality of care, are stimulating acquisition and counterbalancing the retardant effects of PPS. In light of these counterbalancing forces, concerns that PPS will prevent hospitals from acquiring new high-cost technologic equipment that improves the quality of care may be excessive.

Steinberg and his colleagues thus see--in this particular case--a fair balance between economic and other factors under PPS, so that the narrow marginal incentives of PPS reimbursement under PPS do not entirely deter hospitals from adopting the new technology. However, Steinberg et al. (reviewing the justifications of adopters and non-adopters) are no better able than ProPAC (comparing pre- and post-PPS diffusion rates) to establish authoritatively what optimal diffusion rates would be. It is therefore difficult to establish whether or not concerns about PPS effects on new technology are in fact excessive.

3. International Comparisons

One source of comparative data by which to judge the adequacy of technology diffusion rates under PPS is to look to the experience of other countries to see whether the U.S. experience is notably slow. In a brief data report, Rublee (1989) compares the availability relative to population of selected medical technologies in the U.S. (1987 data), Canada (1989 data), and West Germany (1987 data). For MRI units--a technology that began to be used in numbers in the U.S. only during PPS--availability in the U.S. is almost four times that of Germany and eight times that of Canada, thus suggesting that U.S. rates of adoption are not deficient. For the five other technologies studied--open-heart surgery, cardiac catheterization, organ transplantation, radiation therapy, and extracorporeal shock wave lithotripsy (ESWL)--the results are similar, in that population-adjusted availability is substantially greater in the U.S. than in the other two countries.

A second study (Jönsson, 1989) shows the number of ESWL units in operation per million inhabitants in the U.S. and 12 European countries as of May 1989. This data shows West Germany, Italy, Spain, and the U.S. to have comparable availability of the ESWL units, with availability in Belgium somewhat higher and in other European countries notably lower. The inconsistencies between the Rublee and Jönsson results are not easily explained,[59] especially as we cannot claim familiarity with the international sources of data the two authors use. Indeed, we make no claim to have canvassed the extensive international literature on health care for this literature review[60]--and a more extensive review might clarify the sources of differences in results between these two conflicting reports. But as to the most important result for our purposes--the relative availability of new technologies in the U.S. under PPS--there is no

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[59]Data reported by Jönsson show U.S. availability for ESWL to be slightly lower in 1989 than Rublee reports for 1987. Meanwhile, Jönsson reports German availability to be almost 275% higher in 1989 than Rublee reports for 1987.

[60]The Jönsson and Rublee studies are both in U.S. journals and came to our attention from a discussion in PROPAC (1990). But we have not extended our search back through their citations to the international literature.

important difference in the results. Both studies suggest that the U.S. at least has comparable, and may have much higher, rates of diffusion for the ESWL and other technologies.

4. Cautionary Results

The studies reviewed to this point generally suggest that PPS has not substantially reduced rates of technology diffusion, possibly because the overall financial impact is small in any event, while considerations of market position and quality of care offset the marginal disincentives PPS may present. The question is nonetheless begged as to whether satisfactory diffusion rates will continue longer term for those technologies that have been studied, and whether PPS has notably impeded diffusion of at least some technologies not specifically evaluated in the studies cited above. As to the first point, Hlatky and Greenfield (1990) review the effects of recalibration for three DRGs for acute myocardial infarction. While a new, much costlier technology--thrombolytic therapy--has improved clinical outcomes for acute myocardial infarction, recalibrations from 1984 to 1988 actually have reduced DRG weights 10% to 15% for two of the three DRGs (the weight of these DRGs relative to others has declined, notwithstanding the cost contribution of new technologies within these DRGs). This example is simple and ignores possible mitigating factors, but it makes an important point: that when a cost-increasing technology is being introduced, the recalibration methodology will not necessarily increase the weight of the assigned DRG(s), so as to reduce the marginal disincentive to adopt the new technology.[61] Without some reduction in the financial disincentive over time, there is reason to be concerned about whether hospitals will ignore the disincentive indefinitely or will continue to find compensating reasons to use the technology. Thus, even if overall diffusion rates in the short term may be adequate according to studies done to date, the long run may present more worrisome results.

Meanwhile, not all studies done to date reflect such satisfaction with the rates of diffusion under PPS. A notable dissenting study is Kane and Manoukian (1989), which reviewed the diffusion of cochlear implants as treatment for hearing loss. The introduction of cochlear implants occurred after PPS was implemented, so that there is no pre-PPS experience upon which to base

[61]PROPAC (Report to the Secretary, 1988) recommended increasing the science-and-technology component of the 1989 discretionary update factor to take account of the cost of thrombolytic agents. HCFA chose not to follow this recommendation. As a result of HCFA's decision, PROPAC (1989) expressed concern that financial disincentives might limit availability of thrombolytic agents to Medicare patients. (It is worth noting as an aside that PROPAC's recommended course would have altered the average reimbursement across all DRGs, but would not have changed the marginal disincentive.) In any event, PROPAC performed a small (N=93) survey of hospital pharmacists to explore availability of thrombolytic agents. The survey revealed that 86% of the pharmacies carried the thrombolytic agents, and that slightly more than one-half of Medicare patients receiving thrombolytic treatment were being given the more expensive of the two common agents. An unspecified number of cardiologists interviewed by PROPAC offered similar results: the more expensive agent was used somewhat more frequently than the less expensive agent, for both Medicare and non-Medicare patients. While these results are presented as a reassurance, the question remains as to what socially optimal rates of use would be.

any comparisons.[62] Payments for these implants have remained well below the average cost, and (as of fiscal year 1987) few implants had been made. The 3M Company (which had developed the original, FDA-approved, single-channel model) stopped active marketing of its device--and curtailed research in this area as well--due to the disappointing rate at which its models were being used. Indeed, of the five firms that developed cochlear implants for the U.S. market from 1978 through 1985, three have left the market, while no new firms have entered the market with FDA-approved devices. Ten percent of the 170 hospitals providing multi-channel cochlear implantation at the time of the study have openly acknowledged to the manufacturer that they restrict the provision of the implant because of the loss of $3,000 to $5,000 that is incurred with each Medicare case. The authors conclude (p. 1380) that cochlear implants were not widely adopted because "... physicians wanting to perform the procedure had to overcome the hospital's strong financial disincentives."

Kane and Manoukian's evidence is largely anecdotal, and a variety of questions are left unanswered. For example, the fact that some companies left the market could simply be due to the ordinary workings of competition. Low adoption rates could be a sign that the system has judged the clinical value of cochlear implants to be insufficient to offset the high cost of the procedure. But it is also possible that cochlear implants are an unintended casualty of PPS: an infant technology with serious promise, that a social cost-benefit analysis would judge to be worthy of greater encouragement. If the latter assumptions were true, cochlear implants would stand as an unintended casualty of PPS and an exemplar of a more fundamental flaw in the system.

The problem with appraising the results on cochlear implants is the lack of a clear benchmark against which to compare actual experience. No authoritative judgment of the optimal balance of cost and benefit exists. Medical technologies are adopted as the accumulation of individual decisions made within the relatively arbitrary incentives of the system--a result that is as true of pre- and non-PPS methodologies as it is of PPS itself.[63] In a thoughtful review of the costs and benefits of a particular technology (low-osmolar contrast agents for certain radiologic procedures, or LOCM), Jacobson and Rosenquist (1988) summarize the problem:[64]

> From product development to reimbursement, this case demonstrates how public policy develops through the accumulation of individual decisions rather than by the careful coordination of all relevant factors. Once the [LOCM] agents were approved by the [FDA], the absence of a national policy (as expressed by a consensus panel or other assessment) precluded an evaluation of need, potential use, and overall costs.... [P]olicymakers never determined that aggregate costs of this product would bring commensurate benefit. No policy-making entity examined alternative strategies (such as

[62] FDA approval for so-called single-channel implants was granted in late 1984. HCFA approval of coverage for single- and multi-channel implants came in 1986.

[63] The incentives are arbitrary in that they are not gauged to reach a socially optimal result, nor are they coordinated in some fashion to reach any particular result.

[64] See also the discussion of LOCM in Lave (1990).

limiting availability to high-risk patients), and there was no consensus on the need for this particular technology vs [sic] the manner in which these resources could be otherwise allocated.

This argument goes to the heart of the problem of judging the effects of PPS on the diffusion of new technologies. Without some consensus standard on what diffusion rates should be, we lack standards of judgment for concluding that any particular technology is inappropriately impeded by PPS incentives. Given that difficulty, we can look to studies like Kane and Manoukian (1989) as a reminder that hospitals do not blithely ignore marginal losses on all new technologies for the greater good: PPS apparently encourages the observed result for cochlear implants, and there is nothing in PPS (once the DRG assignments were established) explicitly to prevent it.

At the same time, however, the slow initial diffusion rates for cochlear implants and the decline in commercial interest in the devices represent problems only if we have a clear consensus that wider use and greater commercial interest are warranted. We lack that standard, and the simple fact that PPS discourages cochlear implants does not settle the issue.

5. The Effects of PPS on New Technologies: Conclusion

PPS assumes hospitals will strike a benign balance between revenue and the costs of treatment. Even when DRG payments create a marginal disincentive for particular technologies, hospitals are expected to take losses on particular cases, since:

- not all new technologies are affected--DRG reimbursement for cost-neutral or cost-decreasing technologies should cover marginal costs.
- average reimbursements will be adequate--the unfavorable cost variance for particular cases will be made up by favorable results for other cases.
- capital costs of new technologies are exempt from PPS--insofar as new technologies have major capital cost components, PPS has little direct effect on them.
- new technologies will do little to reduce the profitability of hospitals--the added costs of adopting new technologies add little to total inpatient costs.
- new technologies leverage other financial and professional considerations--market share, the quality of care, malpractice, and other hospital concerns may offset marginal reimbursement losses.
- full funding of new technologies through a diffusion period would create little incentive for manufacturers and hospitals to economize--"revenue neutral" funding for new technologies would do less to impede clinical exploration of a new technology's value, but the absence of any financial constraint would create a new domain of cost-based reimbursement free of the economizing pressures PPS was designed to introduce.

Thus, as implemented, PPS assumes new technology to be one of many sources of case-by-case cost variation within a system of average cost reimbursement. Marginal disincentives for particular technologies are not significant overall, they are compensated by other factors, and they are a necessary part of a new regime that introduces considerations of cost into treatment decisions.

Published research suggests that the diffusion rates for many new technologies have been adequate, measured against such standards as pre-PPS rates of diffusion, international rates of availability, and the justifications hospitals offer for decisions on whether to adopt new technologies. For example, ProPAC implies that continued positive growth rates after PPS for a number of technologies provide at least first-order reassurance that the effects of PPS on technology diffusion are not harmful.[65] Other studies show, however, that PPS may have notably negative effects in particular cases, such as cochlear implants.

PPS does not impede all new technologies, and a justification can certainly be offered for the bias of PPS against cost-increasing technologies--it is not obvious that PPS should fully fund all new technologies through a diffusion period. But following the logic of Jacobson and Rosenquist, the problem of PPS and new technology concerns the *consistency* and precision of the incentives it presents: the incentives of PPS for the diffusion of new technology are likely to be arbitrary, with winners and losers among technological possibilities being determined by improvisations within the structure of DRGs (and associated weights) <u>that happen to be available</u> as logical assignments for each new technology. The marginal incentives that PPS ultimately provides for each new technology do not signal some social optimum. Instead, they are a practical accommodation to an intricate structure of reimbursement that cannot be tailored to each new innovation. Some technologies are favored, and some are disadvantaged, as a result of this process of accommodation. Some of the disadvantaged technologies will nonetheless be adopted in volume, due to other factors that influence hospitals to buy technologies that are nominally unprofitable. But these offsetting factors are themselves unpredictable (at least in the sense that we know little about them, given the few studies that are available), so that offsets to PPS disincentives cannot be relied upon to override the disincentives in all cases.

If we grant these problems in PPS, however, we must also emphasize that--in the absence of some standard to determine what technologies should be encouraged--<u>more generous reimbursement would be arbitrary as well</u>. The pre-PPS regime of cost-based reimbursement was not a reliable path to optimal rates of technology diffusion. Cost-based reimbursement was, in its own way, as arbitrary as PPS, albeit with a methodology that erred on the side of encouraging and accommodating technology and other costs of treatment. PPS represents a different balance of cost and benefit, and possibly a better balance. But in the inconsistency of its incentives across different technologies, PPS takes on risks that prior reimbursement methods--in their more uniform generosity--avoided. Research done to date demonstrates that these PPS risks have not resulted in a large and systematic reduction in the rates of adoption of new technology. The research also raises a caution, however, that some technologies may have been discouraged.

[65]The implication is not frivolous. If the post-PPS rates showed sharp, negative shifts, most observers would view those shifts as a cause for concern. The positive results reported by PROPAC are at least a reassurance that the most negative results did not occur.

These cautions may become more important in the long-term--as yet unstudied--when adjustments to PPS are more complete and the effects of declining hospital margins are felt.

D. Hospital Specialization

PPS was expected to encourage hospitals to specialize in the services they could offer more efficiently (e.g., Stern and Epstein, 1985). The logic behind this expectation was straightforward. Under PPS, each hospital would face incentives to expand profitable services and to curtail unprofitable services. Of course, hospitals had to take account of factors beyond the simple difference between payments and costs--concerns such as market position and the quality of care were expected to influence the exact portfolio of service offerings. But PPS was expected to encourage specialization, so that particular services would increasingly be provided by more efficient hospitals. Two benefits were expected to follow. First, the quality of care was expected to improve: PPS would take advantage of the correlation between volume and patient outcomes for particular services, by increasing the proportion of services provided in higher-volume facilities. Second, costs would be reduced by reallocating services to more efficient providers.

In fact, these simple expectations were open to challenge. For example, lower-cost hospitals might achieve their financial advantage by providing services of lower quality, rather than providing services more efficiently (Stern and Epstein, 1985). Or hospitals might achieve their lower costs by treating relatively healthier patients within each DRG, thereby doing little to improve the allocation of patients to more efficient providers (Dranove, 1987). With respect to the quality of care, it was indeed possible for quality to improve as volumes increased at some facilities; however, it was also possible for these improvements to be mitigated by quality declines at other facilities, where volumes decreased.

The published literature on the specialization of hospitals is relatively limited. But it does provide important evidence bearing on the contrasting predictions outlined above. The results of the literature can best be considered in terms of two different ways of measuring specialization.

1. The Number of Hospitals Performing Specific Procedures

Specialization can be measured in terms of whether or not hospitals offer particular services or procedures. According to this measure, hospitals are more specialized if they offer fewer services, and less specialized if they offer more services.[66] Studies performed for ProPAC generally show that hospitals seem to be expanding services rather than ceasing to provide them. For example, ProPAC (1988) reports a study of six surgical procedures for Medicare beneficiaries for fiscal years 1984-1986. By 1986, the number of hospitals performing these procedures on Medicare patients had increased 5%-10%. At the same time, while the average number of

[66]For this measure, the principal issue is which particular services are available at each hospital. The volume of those services is ignored.

procedures performed per hospital grew,[67] it grew less than the total number of procedures performed. ProPAC concludes (p. 25): "... overall, there is little evidence of concentration in the sense of consolidation or clustering of procedures in a few high-volume hospitals." A later study reported by ProPAC (1990) for five procedures for 1984, 1986, and 1988 reached a similar conclusion: each year, the number of hospitals performing the procedure increased somewhat, with little evidence that procedures were being consolidated.

A survey of CEOs and CFOs at a nationally representative sample of 89 acute-care hospitals (reported in ProPAC, 1989) suggests a set of underlying reasons why hospitals have tended not to specialize by eliminating services (p. 113):

> ... hospitals seem to be expanding services rather than ceasing to provide them.
>
> PPS appears to have contributed to this widespread trend. Indeed, hospitals have begun to offer an array of new services, with many added since 1984. Many hospitals are attempting to increase market share, shift their payer mix to any remaining cost-based payers, and attract cases known to be more profitable....
>
> Few hospitals plan to reduce services in the future, regardless of their profitability. Most do not plan to specialize in selected services either. They avoid reducing services or specializing because these strategies could have an adverse effect on market share....
>
> Services discontinued since 1983 are largely not covered by Medicare. In fact, over half the hospitals that discontinued services reported that DRG payments had nothing to do with the decision....

The implication of all of the ProPAC-sponsored research summarized above is that: 1) the portfolio of services marketed by hospitals has, if anything, increased with the advent of PPS, and 2) even where there are procedure-specific financial disincentives, competitive considerations force hospitals to diversify rather than specialize.

2. The Relative Volume of Procedures Each Hospital Performs

The results discussed above suggest that little specialization occurred after PPS, in terms of simple measures of how many hospitals offered particular services to Medicare beneficiaries. A different picture emerges if the measure of specialization is changed, to reflect the relative volume of procedures each hospital performs. The most sophisticated published study of specialization and its economic consequences is Farley and Hogan (1990). The study is based on a national sample of 324 short-term, non-federal hospitals for the years 1980-1985. The study applies to all hospital inpatients, not only to Medicare patients; and to a complete array of

[67]The total number of procedures for five of the six types of surgery had increased sufficiently to make it possible for both the average number of procedures per hospital and the number of hospitals performing the procedures to increase.

procedures, not only a few selected procedures.[68] Farley and Hogan develop a specialization index which measures the extent to which actual case-mix proportions differ from expected or baseline proportions, with higher index numbers indicating greater deviation from baseline case-mix proportions.[69]

Regression results from this analysis reveal a significant increase in the specialization index from 1980-1985, most of which has occurred since 1983. This trend of specialization appears to have reduced costs (on the order of 1.6% from 1980 to 1985). The largest increases in specialization appear to have occurred in hospitals experiencing the largest increases in average costs. These results support the hypotheses that changes in specialization since 1983 have been measurable, have reduced costs, and have occurred in response to financial incentives.

3. Changes in Specialization Under PPS: Conclusion

Studies of the specialization of hospitals after PPS thus present a mixed picture. Hospitals diversified, rather than specialized, after PPS, in the sense that the number of hospitals that performed particular procedures for Medicare patients increased. Apparently, competitive considerations--notably, fears about losing market share--have been at work to sustain this trend. Meanwhile, for select procedures studied by ProPAC, the volume at the average hospital performing the procedures increased, but largely due to an overall increase in procedure volume, rather than a consolidation of where the procedures were performed.

However, measures of specialization that track changes in case mix across a full spectrum of hospital services and patients show a tendency toward specialization after PPS. There is also evidence to suggest that specialization in this sense was promoted by financial incentives of PPS and contributed to lower average hospital costs.

These results suggest that hospitals are not dropping some procedures entirely to focus on others, but that the relative volume of different procedures within hospitals is shifting somewhat, and with favorable cost results. It is not clear that these trends will continue: the most profitable gains from case-mix specialization may already have been explored (Farley and Hogan, 1990). But these results do provide modest corroboration of some of the optimistic expectations for PPS.

There may be a more interesting issue to consider: what would be the overall effects on cost and quality of more deliberate efforts to bring about dramatic increases in specialization in the provision of hospital services? The reimbursement mechanism may be a crude way to encourage specialization, particularly in view of the competitive considerations that apparently

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[68]By contrast, the PROPAC studies of the specialization in particular procedures (1988, 1990) are based on five or six procedures performed on Medicare patients alone.

[69]The baseline proportion for each procedure (i.e., for each DRG or major diagnostic category) is that procedure's share of the national case mix for each year. (Since a separate baseline is computed for each year, the index is insensitive to industrywide variations over time--notably, declines in the number of admissions and changes in DRG coding.) The index equals zero for a hospital with a case mix that exactly equals the baseline proportions for all procedures, and it increases as the hospital's case-mix proportions deviate more substantially from the baseline proportions.

drive hospitals to maintain many unprofitable services. Direct efforts to consolidate services (e.g., through selective contracting) might have a greater impact than the small-scale specialization effects observed for PPS. Specialization may have been a benign side benefit of PPS. But in view of the results, we should not mistake PPS for an effective specialization strategy, at least over the limited periods studied to date.

E. Hospital Management

Given all of the different effects of PPS detailed in this literature review, it would be a great surprise if PPS did not work substantial changes on hospital management. PPS was designed to create incentives for the balancing of costs and benefits in treating patients. In the economic model of the hospital as thus construed, the hospital is a black box, calculating and adjusting bloodlessly to the new regime. In actual hospitals, each of the incentives and adjustments required people within the hospital to think differently, to attend to different information, to accept different roles, and to make different decisions. New institutional capabilities (e.g., new information systems) were required for hospitals to move through the steps of change to which PPS pointed. Hospital management changed in important ways as a result.

The literature addressing the effects of PPS on hospital management is voluminous and fragmented and is itself only a part of the more general literature on hospital management and medical practice amidst rapid changes over the past decade in health finance. We can only suggest some of the major themes of how PPS affected hospital management. There are a series of themes that emerge from various treatments of contemporary hospital management:

1. Changes in the organizational culture of hospitals

One persistent theme in this literature is how PPS, reinforced by the flood of other changes in health finance and health policy, has changed the basic organizational culture of hospitals. Various impressionistic studies and essays suggest that, while hospitals were once decentralized, altruistic institutions, they have now become more businesslike (e.g., Alper, 1984; and Grassi, 1989); more bureaucratic, conservative, and cost conscious (e.g., Berki, 1985); or more competitive and proprietary in their thinking (e.g., Burda, 1988). It is important to read such accounts with some care, since the change involved here is not drastic or complete. Among other reasons for caution:

- Some of these contrasts are too prosaic--particularly in how they confuse the autonomy of a more tranquil past with the absence at that time of any motives of self-interest. Since long before PPS, hospitals have been a business, in addition to everything else they were.

- Physicians remain powerful--they have to be courted, as well as managed, by the hospital--and their concerns mitigate narrow management impulses. For example, Campbell and Kane (1990) present case studies of physician-management relations during PPS implementation at the Hospital Corporation of America and four of its

hospitals. The studies revealed that HCA had not micromanaged its physicians on key parameters like occupancy rates and lengths of stay--even in the face of declining financial results--out of a belief that it was (p. 604) "... in the corporation's best interest to assure physicians a high degree of practice autonomy." Note that the commitments of HCA depicted in this study suggest that the world of health care--even for-profit health care run by a corporation--is not entirely dominated by parochial or simple-minded norms of corporate management. A self-interested hospital cannot attempt crudely to control physicians in a "businesslike" way, without subverting the hospital's standing with physicians (and its competitive success) in the local market.

- The new management consciousness has notable limits. For example, to an important extent, physicians appear unaware of the costs of procedures they order--one post-PPS survey of residents and faculty at a medical center (Thomas and Davis, 1987) found that only one-third or less of the respondents could guess the costs of common and uncommon tests within ± 20% of the correct cost. These results were not notably different from the results of physician cost awareness studies done in the 1970s (see citations in Ibid.). While only applicable to physicians and to one hospital, results such as these are a caution on assuming that the new management consciousness is different in all important respects from the old consciousness.

In view of these considerations, we should not take too expansive a view of the extent of the change in the organizational culture of hospitals. But granting that there are limits to the change, few would few would doubt that it has occurred--few would doubt that PPS has engendered a decided shift toward the forms and substance of more businesslike management.[70] What was <u>sub rosa</u> in earlier years has been brought into the open, as the explicit language and the more central purpose of hospital administration.

2. <u>Changes in the methods and techniques of hospital management</u>

As the organizational culture of hospitals changed, so did the methods and techniques of hospital management. First, PPS established a direct link between hospital payments and the coding of the medical record, thus giving hospitals a new incentive to develop more complete records and coding to maximize reimbursement. Hospitals have put in place the software and administrative procedures necessary for more refined coding and billing, which have had the effect of increasing the average case mix, independent of real changes in the underlying severity of

[70]Some of the changes in form are suggested by Alper (1984), who notes the proliferation or reorganizations and new staff titles throughout the hospital: an exercise in business-speak, as administrators grope to imitate the styles of corporate management.

patient illnesses or the resources required to treat those illnesses.[71] Second, in addition to coding and billing procedures, some hospitals have substantially increased their reporting and analysis capabilities--e.g., developing new management reports, analyzing physicians' practice patterns, and estimating more precisely the fixed and variable costs of various ancillary services (e.g., McNeil, 1985, a study of one hospital). Finally, many hospitals have increased their cost accounting capabilities. A survey of a national sample of hospitals performed for ProPAC (1989) revealed that a majority of the hospitals now had automated cost accounting systems. (Hospitals without such a system or a plan to develop one were predominantly small rural hospitals.) Respondents identified PPS as a contributing factor in the decision to implement new cost accounting systems.[72] While this result suggests an increasing sophistication in accounting capabilities at hospitals, ProPAC noted that most of these accounting systems use the traditional ratio of costs to charges as their costing method, rather than some more advanced techniques now available to the industry. Thus, as with changes in organizational culture, there are signs of notable changes in hospital management methods, but those changes should not be viewed too expansively.

3. Changes in the relationships of physicians to hospitals and hospital administrators

Given the more accommodating financial terms of hospital reimbursement prior to PPS, the potential conflict between physicians and hospitals was muted. PPS created the potential for more direct conflict (Glandon and Morrisey, 1986). A majority of physicians report feeling new pressures from hospitals to change practice patterns--e.g., in a 1984 nationwide survey for HCFA (cited in Russell, 1989), nearly two-thirds of physicians reported that they were being encouraged to discharge patients sooner. However, the extent of such pressures is not uniform: for example, as noted earlier, the pressures in some cases have been muted by the commitments of hospital owners and administrators to maintain strong hospital-physician relationships (Campbell and Kane, 1990).

4. The Effects of PPS on Hospital Management: Conclusion

The results outlined above suggest some of the principal ways in which PPS appears to have affected hospital management. The effects have been important, but should not be overstated. Meanwhile, in part due to the impressionistic character of most of the studies, it is difficult to establish the ultimate significance of most of the changes they describe. The summary impression one gets from them is that PPS (along with other public and private health care

[71]For example, the percentage of Medicare inpatients with at least one coded comorbidity or complication rose from 46% in 1980 to 60% in 1984 (DesHarnais, Kobrinski, et al., 1987). An unpublished 1989 study by SysteMetrics/McGraw Hill reports that the average number of secondary diagnoses per patient increased from 1.9 to 2.7 between 1984 and 1986 (described in Steinwald and Dummit, 1989). Carter and Ginsburg (1986) estimate that almost one-third of the 1984 increase in the Medicare Case Mix Index was due to hospital upcoding. See the more detailed discussion of this issue in Section A.4 of Chapter II.

[72]Other factors identified included the need to make informed pricing decisions and control costs, to evaluate the performance of managers, to develop performance standards, and to determine profit and loss by service.

initiatives of the 1980s) has moved hospitals in a more cost conscious, more businesslike direction, much as was intended. Hospitals and physicians clearly feel that they are in a very different business, and doing that business differently, than they were a decade ago. Published studies give voice to those general feelings, although the tangible consequences of the changes involved are diffuse and not well understood.

The literature on hospital management is thus consistent with the effects of PPS described in other sections -- the management literature suggests new attitudes and capabilities that could support the other effects we have observed. However, the management literature and the effects literature are not joined: in the end, we lack a systematic, concrete picture of how the significant changes in operations under PPS were actually administered. A more detailed appraisal of the connection between hospital operations and PPS effects would give us a better understanding how hospitals generate and control costs and would give us a more reliable foundation for making policies to shape the hospital environment.

F. Clinical Research

The key worry with PPS and clinical research involves clinical trials, rather than "bench" research, data collection and analysis, experimental drugs, and similar research costs, the funding of which has traditionally been from research grants (notably from NIH). The costs incurred for clinical research purposes, over and above usual patient care, were not allowable costs before PPS and are not allowable costs now. However, when research is conducted in conjunction with and as part of the care of patients, the costs of usual patient care are allowable if they are not paid for by other sources. Steinwald (1986, p. S57) comments:

> Regardless of what the regulations say, it is widely believed that Medicare payments to hospitals provided substantial subsidies for the costs of clinical research in the past. An example is the [pre-PPS] case of Barney Clark, the first human recipient of an artificial heart.... Medicare paid the hospital approximately $200,000 for a variety of covered services delivered during 112 of the 116 days of the hospital stay.[73] It is uncertain how much the hospital would get paid today under DRGs. Suffice it to say that it would be far less than $200,000. [Citation omitted.]

The basic problem under PPS is that Medicare no longer reimburses for each allowable day, test, and other cost of treatment--the payment is fixed for the appropriate DRG. The DRGs do reflect past clinical research costs, in that the DRG weights were calculated from data in which many clinical research costs were embedded (costs akin to the reimbursement for Barney Clark's care). However, for a given DRG, the DRG weight reflects an average across research and non-research clinical cases. Since research cases tend to be more costly than non-research cases, the hospital is discouraged at the margin from taking on research cases. Hospitals are not collectively

[73]According to Davis (1985), Medicare reimbursed for all of Barney Clark's hospital days, except those that were solely devoted to the implantation of the artificial heart. The total reimbursement was $254,000, covering 114 days of care. The implantation itself was an experimental clinical research procedure and not covered by Medicare.

disadvantaged, but reimbursement is in effect distributed away from hospitals doing a disproportionate share of research.[74]

HCFA (e.g., Davis, 1985) and ProPAC (e.g., Steinwald, 1986) have acknowledged the fact of potential disincentives at the margin, but have offered a number of arguments in response. First, while DRG payments will be less than hospital costs of treatment for many research patients, payments will be greater than costs for other patients. Commenting on cancer research, Davis (1985, p. 687) notes:

> This principle of averaging is one of the basic points of the prospective payment system. A hospital may lose money on a particular case or group of cases, but it may also make money on another case or category of DRG. We trust that a well-managed hospital operating under the prospective payment system would be able to order its priorities to enable continuance of its clinical cancer research program.

Second, certain types of hospitals--e.g., cancer hospitals--in which much expensive research occurs are exempted from PPS. Third, the PPS statute requires that financing appropriate scientific and technological advancement be given consideration in setting the annual increase in DRG prices. While the actual extent of this component of the update factor is uncertain from year to year, HCFA is required by law to consider the needs of research in setting it. Hospitals may use part of any payment increment that results to finance costs of clinical research. Fourth, teaching hospitals receive Medicare payments for direct teaching costs, as well as special allowances in DRG payments for indirect teaching costs. There is a correlation between teaching hospital status and research intensity. Steinwald (1986, p. S58) notes:

> Ostensibly designed to cover the treatment costs associated with the presence of interns and residents in teaching hospitals, the indirect teaching adjustment is a catch-all for a variety of reasons why patient costs tend to be higher in teaching hospitals, including the costs of clinical research. [Citation omitted.]

Finally, the federal government, as well as private and other public sources, give substantial grants to research hospitals to perform clinical research (Davis, 1985). By implication, while Medicare reimbursement paid certain hidden costs of research in the past, that practice should not necessarily continue.

The effects of PPS on clinical research are thus like many other PPS effects: at the reimbursement margin, there is a likely disincentive, but there are an array of other influences present possibly to offset that disincentive. Even if the net effects of PPS on clinical research are somewhat negative, that result would not by itself be proof of harm--indeed, it might suggest a better balance of costs and benefits. As HCFA's Davis (1985, p. 687) notes: "Under prospective payment, hospitals will likely trim away only those programs that they cannot manage efficiently or in which they have no overriding interest." Worried clinicians would likely find that summary

[74]Some fears have also been expressed (e.g., Steinwald, 1986) that average reimbursement might become inadequate under PPS--that is, that PPS might in due course be used to contain hospital costs so significantly that hospital discretion to invest in research activities would be eroded.

appraisal too complacent and, in any event, are uncomfortable with the idea of cost disincentives under an average-price regime (e.g., Yarbro and Mortenson, 1985, who argue for a special research DRG for NIH-approved clinical trials, to be reimbursed on a cost basis).

Some of this dispute is simply a reflection of a more general disagreement on the role of incentives in health care. But some of the dispute could be informed by careful estimates of the net effects on clinical research that PPS actually has had. Unfortunately, while there is some anecdotal information in the published record (e.g., Ibid.), we are aware of no systematic empirical study in the published literature that would permit careful estimates of net PPS effects. In the absence of such estimates, it is fair to say that potential harms have not been documented. However, we also have no way to confirm HCFA's prediction that the only casualties would be research of marginal interest, or research that could not be efficiently managed.

G. Uncompensated Care

Medicare reimbursement and uncompensated care are not directly linked, since Medicare assumes no formal obligation to cover the costs of uncompensated care. However, a potential indirect linkage has long existed, through the medium of the hospital balance sheet. Uncompensated care--a combination of free care and bad debt--could be provided by cross-subsidization from paying patients[75] and from other revenue sources (e.g., non-patient care revenue, state and local appropriations, and charitable contributions). By reducing hospital margins, PPS could reduce the funds available to hospitals for this, as other, purposes, thereby reducing the willingness of hospitals to treat patients who are unlikely to be able to pay for their own care. Since the pool of the uninsured increased substantially in the 1980s as PPS was being implemented, concerns about the possible effects of PPS on uncompensated care became more serious.

Two studies of PPS and uncompensated care generally fail to find a negative effect. Sheingold and Buchberger (1986) simulated the effect of PPS on the financing of uncompensated care by the highest-volume providers of care. Their simulation results suggested that the direct effect of PPS would be to increase somewhat the level of uncompensated care among the highest-volume providers. The reason: PPS would redistribute payments relative to costs among hospitals, and hospitals expected to gain under PPS (notably, those with large teaching programs) tended to be higher-volume providers of uncompensated services. Not all localities were likely to be affected uniformly, however--in some areas, reductions in uncompensated care might occur. But the general prognosis was encouraging. The principal problem that Sheingold and Buchberger foresaw was that, if the generosity of PPS compensation were reduced in due course, then the negative effects of PPS would be more widespread and substantial.

This simulation study was followed by an analysis of historical data by Sloan, Morrisey, and Valvona (1988c), who sampled abstracts for patients who were discharged from CPHA

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[75]Given evidence suggesting that hospitals have a limited ability to shift costs among payers (see Section A of this chapter), we should be cautious in assuming that Medicare played an important role in cross-subsidizing uncompensated care before PPS.

hospitals in 1980, 1983, 1984, and 1985. For their analysis, Sloan and his colleagues divided hospitals into seven mutually exclusive groups: flagship teaching, other Council of Teaching Hospitals (COTH), other public SMSA, other public non-SMSA, voluntary SMSA, voluntary non-SMSA, and investor-owned. The authors also included an array of independent variables in their regressions to control for a variety of different possible influences: the size of the pool of patients unable to pay for care (e.g., workforce participation variables), the share of self-pay/no-charge patients cared for by a particular hospital in the community (e.g., whether the hospital was the only hospital in the community), the level of competition in the local medical market (percent of the population enrolled in an HMO), and other factors. Their results are consistent with Sheingold and Buchberger's simulations:

- Between 1980 and 1985, the proportion of self-pay/no-charge patients increased for all seven hospital types.

- Between 1983 and 1985, the proportion of self-pay/no-charge patients increased substantially for flagship teaching hospitals (which had begun the decade with a high self-pay/no-charge patient base) and stayed the same or increased slightly for the balance of hospital types.

Based on their regression results, the authors ultimately conclude (p. 95) that "... hospitals under PPS were, if anything, more likely to accept uninsured patients for treatment."

These studies suggest that worries about the effects of PPS on uncompensated care may have been misplaced--at least for the early years of PPS, when PPS rates were generous for the principal providers of uncompensated care. The generosity of PPS rates declined in later years, however, suggesting that the effects of PPS on uncompensated care may have been more negative after the initial favorable experience. We are not aware of any systematic study in the published literature to confirm the point. But the same studies that give us some confidence about the early effects of PPS support a reason for concern about what might have happened thereafter.

H. The Effects of PPS on the Health Care Industry: Conclusion

PPS has had a major effect on the health care industry, as virtually all observers would concur. This chapter has discussed six different areas of possible effects. What is striking across these six different areas is how few of the original fears have been confirmed:

- There is likely little cost shifting from Medicare patients, and PPS does not appear to have exacerbated the problem. (Indeed, PPS may have reduced the costs for at least some other payers.)

- PPS does not appear to have caused any notable reduction in the diffusion of new technologies. Most technologies that have been studied appear to have entered wider use under PPS at more or less ordinary or unexceptional rates. While there are some specific technologies that have suffered under PPS, those negative examples suggest a caution about the possible arbitrariness of PPS incentives, rather

than a confirmed problem, in the absence of more authoritative specification of optimal rates of diffusion.

- There is some evidence that modest increases in specialization have occurred under PPS, in terms of the relative volumes of procedures performed. However, there in fact appears to be less specialization, in terms of the number of hospitals performing selected procedures.

- There is substantial evidence that--in combination with the multiplicity of other changes in health finance in the 1980s--PPS has helped to bring about substantial changes in hospital management: in terms of the culture of hospital operations, the methods and techniques of hospital management, and the relations between administrators and physicians. However, these changes are not drastic or categorical, and there is little evidence to connect these changes in management to important changes in the inputs or outputs of hospitals.

- There is evidence to suggest that PPS may actually have increased the provision of uncompensated care by hospitals, by virtue of payment levels that favored hospitals providing a disproportionate share of uncompensated care.

- There is little evidence, pro or con, on the question of whether PPS has had an adverse effect on clinical research.

In view of these results, it is fair to say that PPS has not caused any clear or demonstrable harm to the health care industry in any of the six areas of major effects reviewed in this chapter. It is also important to reiterate that--as with other questions about the effects of PPS--this relatively optimistic picture of how PPS has affected the health care industry is gleaned from research based on the early years of PPS, when PPS rates were more generous. The effects of PPS may be more clearly negative in the later years. For example, hospitals may be less willing to absorb losses on particular new technologies or for uncompensated care, as growing losses force greater attention to bottom-line results. To date, however, we have no evidence to indicate that such results have occurred.

CHAPTER V.

QUALITY OF CARE

An unspoken assumption under the cost-reimbursement systems of the past was that more care is better care (e.g., ProPAC, 1987). PPS reflected a skepticism about this premise--indeed, PPS was based on the belief that some of the care being provided was unnecessary in the sense that the benefits to patients were small at best, even as the costs of the care were substantial and insufficiently taken into account by providers. But was there a practical means to set the incentives in precisely the right way, so as to eliminate only the inefficient and encourage only the efficient provision of care? In fact, there was not. The incentives of PPS were open to a range of outcomes, some of which could be beneficial and some of which could be decidedly detrimental to patients. As Lave (1990, p. 517) comments:

> A priori, hospital prospective payment could lead to either an improvement or a decline in the quality of services provided. On the one hand, the financial incentives of PPS are to limit the quantity and cost of services provided. If services are inappropriately reduced, this reduction could adversely affect the health of Medicare beneficiaries. On the other hand, since hospitals receive a fixed amount per discharge, they may face stronger incentives to implement infection control procedures, to monitor drug therapy to reduce adverse drug reactions, and to avoid other types of iatrogenic disease. If these actions were implemented and were effective, then the quality of care would improve.... [Citations omitted.]

PPS in effect viewed hospitals, physicians, and others as buffers between the purely financial incentives of PPS and the patients' need for quality care. There was some uncertainty about the ultimate balance that would in fact result.

The effects of PPS reviewed to this point do not resolve those uncertainties. Indeed, standing alone, virtually all of the changes we have observed could be associated with harm to Medicare beneficiaries. Consider:

- Inpatient hospital admissions have declined; and hospital closures (particularly rural hospital closures) have increased, albeit that this increase may not be attributable to PPS. These changes give rise to the obvious question of whether beneficiaries have had sufficient access to needed inpatient care since PPS was implemented.

- Similarly, lengths of stay declined systematically at the outset of PPS. While this decline was expected, are patients being discharged too quickly under PPS, as was feared when PPS began?

- The intensity of care for at least some services and some patients has been reduced. Are patients being harmed by the reduction in tests, procedures, and other care that appears to have occurred?

- There has been a substantial shift of former inpatient admissions and care to outpatient/non-hospital settings. While this shift may have been economical, has it in fact moved patients into settings where the quality of care is lower on average?

- Inpatient hospital care has become a smaller portion of the average episode of care. This change could mean that episodes of care are less continuously and consistently managed than before PPS. Has the quality of care for complete episodes declined as a result?

- PPS may have discouraged the adoption of some new technologies; and the disincentives to innovation may get worse, as hospital margins narrow. Will patients miss important opportunities for improved care, as (and if) the rate of technical improvements slows?

- There has been a decline in the rate of growth of Medicare expenditures. Does that decline alone signal lower quality care for Medicare beneficiaries, even if--at finer levels of analysis (e.g., practice patterns)--we fail to detect harmful changes?

- Finally, hospital margins generally increased in the early years of PPS; but in the later years of PPS, margins have declined. Even if the quality of care held steady in the initial years of PPS, will it now decline, under the inexorable financial pressures of declining margins?[76]

Thus, the principal effects of PPS that we have reviewed--on hospital finances, provider practice patterns, Medicare expenditures, and industry effects--could in virtually every case reflect some underlying harm beneficiaries. In this section, we will review the published evidence on whether any identifiable harms have resulted.

Before beginning this review, it is important to emphasize two points. First, a de facto normative standard has been applied to results in this area: has PPS been associated with a decline in any conspicuous measure of the quality of care? In principle, some decline in quality might be acceptable, as an appropriate trade of quality for savings. In fact, PPS was implemented with the expectation that savings could be had without any noticeable effect on quality. The savings were to come from efficiency--there was no grand consensus to trade cost for quality. The normative standard for research results has followed that presumption.

But this normative standard is based on more than the character of the original political consensus behind PPS. It is also a result of the relative crudity of concepts, data, and methods available to estimate changes in quality. We may wish to compare changes in the quality of care, for complete episodes, across the whole array of treatment settings. But the practical means available are not nearly so discriminating as the questions we bring to this area. Relatively little

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[76]The questions set forth in the text concerning the effects of PPS on quality reflect questions others have asked. The best general discussions are Russell, 1989; and the report of the major RAND/HCFA quality study published in the October 1990 issue of the Journal of the American Medical Association (summarized in Rogers, Draper, et al., 1990).

is known about the quality of care in non-hospital settings; and even for hospital settings, most of what is known is based on such measures as mortality and readmissions that cannot track or reveal many important dimensions of the problem. In view of these limitations, it is only prudent to view any detectable decline in available measures as a signal that more complex and far reaching difficulties may be present. In that sense, studies in this area are generally exploratory, rather than definitive--the failure to find a decline in some measure of quality is only tentatively reassuring, since (as virtually all researchers emphasize) many potential problems are invisible to the data and methods employed. The significance of this point will become clearer in the discussion below.

If we grant these limitations, we must also take note of the progress that has been made, a task best accomplished as we review the literature in this area. Our review will begin by discussing the access of beneficiaries to hospital care, and then proceed to discuss studies of mortality, readmissions, emergency room admissions, and transfers. We then will conclude with a discussion of studies of other attributes of care, in particular studies that link processes and outcomes of care. These latter studies, based largely on medical records, provide some particularly important insights into possible changes in the quality of care under PPS.

In general, as suggested by the summary of findings in Table 6 below, this research fails to document any reduction in access to care or any decline in the quality of care for Medicare beneficiaries. However, there are important exceptions: troubling findings to suggest that PPS may have had selective, negative effects that warrant further investigation.

A. Access to Inpatient Care

Access can be viewed as a component of the quality of care. But like quality of care, access defies simple definition or measurement--a number of different attributes must be considered. However, the literature, on PPS only occasionally takes on the problem of access as such, so that the published evidence on access tends to be piecemeal, drawn from studies focused on other or larger questions. Most of this evidence has already been considered in other contexts for this literature review. It will be useful to review the major findings here.

First, with respect to potential financial barriers to care, Chapter III above suggests that PPS has been associated with only a slight increase in the average financial burden assumed by beneficiaries and has not made the problem of catastrophic episodes of care visibly worse.[77]

[77]One potential problem of financial access to care that our review has raised actually concerns post-hospital, rather than hospital, care. As discussed in Section C of Chapter II, there is evidence that beneficiary utilization of SNF and home health care was reduced by HCFA payment policies implemented at roughly the same time as PPS. While these policies were technically separate from PPS, they were implemented in part to contain pressures for greater utilization of post-hospital care that PPS was expected to create. The effectiveness of these policies is apparent from the significant increase in utilization that occurred when the policies were liberalized, after HCFA lost a set of lawsuits. While these policies appear to have constrained utilization, it is difficult to establish whether that constraint should be viewed as an access problem.

TABLE 6.

SUMMARY OF THE EFFECTS OF PPS: QUALITY OF CARE

AREA OF EFFECT	PRINCIPAL FINDING	SECONDARY FINDINGS	IMPORTANT INDUSTRY DIFFERENCES
•Access	Little evidence that hospitalization being indiscriminately denied.	Greater admissions declines where PPS rates more generous. Possible PRO effects undocumented.	
•Mortality	No documented rise in mortality rates after PPS, whether measured in-hospital or up to one year later.	Some evidence that deaths formerly occurring in hospital now occur elsewhere.	Rates for small and government-owned hospitals slightly sensitive to generosity of rates.
•Readmissions	No significant change.	Possible decline in later PPS years.	Rates for rural and small urban hospitals declined by 1988. Rates for large urban hospitals increased slightly by 1988.
•Transfers	Little change.	Possible increase in transfer rate in later years of PPS.	Some evidence that elderly veterans diverted to VA hospitals.
•ER Admissions	Evidence inconclusive -- possible increase, but likely not due to poor care.		
•Processes of Care	Improvement in explicit and implicit measures of process quality, due to continuing pre-PPS trend (i.e., PPS did not cause, but did not prevent, the improvement). Decrease in stability of patients at discharge.	Indications that discharge planning and management of post-hospital care uneven. Improvements in process and decrease in discharge stability do not vary by patient type (e.g., age, sex, race).	Process improvements greatest for rural, non-teaching hospitals; least for urban, teaching hospitals. Decrease in stability at discharge consistent across hospital types.

Source: Coulam and Gaumer (1991).

Second, with respect to hospital closures, Chapter I above suggests that, while the PPS era has been associated with a higher rate of hospital closures, PPS payment levels (and high Medicare inpatient shares) are not associated with high closure rates. Other factors than the terms of reimbursement appear to have been critical--notably, low occupancy rates and declining patient volumes. The regulatory aspects of PPS (i.e., the PROs) may contribute to the problem, and PPS may provide small institutions a lesser buffer against volatile patient volumes than did cost reimbursement. But even conceding these points, the implications of the closures for access is not clear cut: where closures have occurred, there is some evidence to suggest that access problems have not been notably exacerbated as a result, given the proximity of alternative hospitals.

Third, the decline in admissions under PPS could be evidence that beneficiaries were facing access barriers to inpatient care. However, these declines were selective in generally reassuring ways, and there is little documentation to suggest specific ways in which denials of admission have harmed patients:

- According to HCFA data evaluated by Russell (1989), the admissions declines in 1984 and 1985 were concentrated among beneficiary groups that tend to be healthier (young elderly and white beneficiaries). Groups considered more at risk--older beneficiaries and minority beneficiaries--had the smallest admissions declines. This data support the proposition that admissions declines were discriminating, rather than being implemented across the board with a systematic insensitivity to the frailty of, or the risks faced by, individual patients.

- Most of the admissions decline is due to a shift in former inpatient admissions to outpatient care. For example, the shift to outpatient treatment of only one set of procedures (lens procedures) accounts for over 50% of the admissions decline (e.g., DesHarnais, Chesney, and Fleming, 1988b; and Fisher, 1988a, 1988b).[78] No serious question has been raised that these procedures are inappropriate for the change in treatment setting. To the extent that the decline in admissions reflects an appropriate change in practice patterns, it represents a welcome trend toward more cost-effective medicine rather than a denial of access to appropriate care.

  However, even if most of the decline in admissions can thus be rationalized, the question remains as to whether at least some of the shift to outpatient treatment is questionable or has resulted in problems for some patients. A study of hospitalization for diabetes mellitus in a large Indianapolis hospital (Weinberger, Ault, and Vinicor, 1988) provides one example of the need for caution: in this sample, the shift to outpatient treatment appears to have been accompanied by a

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[78]The study by DesHarnais and others found that lens procedures accounted for 54% of the decline in admissions for a large cohort of CPHA hospitals. See the detailed discussion of this issue in our review of the literature on practice patterns, in Chapter II.

worsening in glycemic control after PPS.[79] For select populations, at least, potential access difficulties require careful monitoring.

- PPS incentives tend to encourage rather than discourage admissions.[80] While admissions nonetheless did decline under PPS, there is evidence to indicate that admissions declines were less in hospitals under greater fiscal pressure from prospective rates (Hadley, Zuckerman, and Feder, 1989). Since admissions reductions were inversely correlated to the effects of prospective rates, it is difficult to attribute the reduction in admissions--or any systematic access problems--to those rates.

  However, even if the general admissions decline cannot be attributed to PPS rates, it is important to be attentive to select populations whose experience may not be average or typical. A diverse array of studies of select populations have shown a disparity between prospective rates and treatment costs for: 1) particular DRGs or groups of DRGs, such as burn DRGs (Chakerian, Demarest, and Paiz, 1990; and Saffle, Larson, et al., 1990), urology patients (Munoz, Mallett, et al., 1988), and patients with unrelated surgical procedures (Kominski and Schoenman, 1990)[81]; 2) particularly vulnerable beneficiaries, such as minorities and the poor (e.g., Epstein, Stern, et al., 1988; and Munoz, Barrios, et al., 1989). These studies document examples for which the marginal costs of treating particular patients may

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[79]The shift to outpatient treatment for diabetes patients is examined for a larger population in the study by Panser, Naessens, et al. (1990). This study found a decline of almost 40% in the age-adjusted rate of hospitalization for diabetes mellitus among elderly residents of Olmsted County, Minnesota, in 1985 compared to 1980. (This reflected a reversal of a trend--hospitalization rates had increased by 1980, compared to 1975. But the study does not show what happened to the rates from 1981 through 1984, so that it is difficult to know whether the shift coincided with the implementation of PPS.) In addition, this study found that the largest declines in the rate of hospitalization (and length of stay) were for the oldest patients (e.g, for those 75 or older, versus those 65-74). This study does not report any data on the glycemic control of patients after hospitalization, so that it is difficult directly to compare its findings to the study of Weinberger, et al. (1988). However, the findings of these two studies at least raise pointed questions concerning access and quality of care. In response to the Panser study, Weinberger (1990) concedes that a reversal of the shift to outpatient care is unlikely "and may not necessarily be desirable" (p. 1270); but he goes on to argue that multifaceted strategies for improving clinical outcomes in the outpatient setting are needed. Thus, in response to the problems raised in these studies (and in response to the improbability of changing the basic PPS regime), Weinberger emphasizes the need to focus on improving outpatient practices, rather than on increasing hospital utilization.

[80]As noted earlier in our review, PPS will tend to discourage admissions in some cases; notably, when: 1) the expected marginal cost of an admission is less than the expected PPS reimbursement, or 2) even if there is a "profit" for an inpatient admission (a positive difference between expected reimbursement and cost), the profit is greater for outpatient or other treatment by the hospital. We know of no documented examples of the latter incentive to reduce admissions, but there are examples of the former, as we will discuss momentarily in the text.

[81]One of many reasons for large negative differences between DRG reimbursements and hospital costs is the introduction of costly new technologies for treatment within established DRGs. This issue is of special interest, as it raises questions not only about the availability of care for beneficiaries, but also about the effects of PPS on the diffusion of new technologies. See the discussion of PPS effects on the diffusion of new technologies in Section B of Chapter IV.

be higher than expected reimbursement. Insofar as such cases can be identified using information available before admission, hospitals have an incentive not to admit the patients--which raises the prospect of potential access problems, at least in the longer run. These problems may become more systematic and general, as the generosity of PPS reimbursement over hospital costs has declined over time.[82] Thus, as Russell (1989) suggests in a slightly different context, there is a need to continue to monitor for selective access problems that disparities in reimbursement may create.

- Apart from the question of whether prospective rates have caused any systematic access problems, there is a question of whether administrative policies independent of the rates--notably, the activities of the PROs--might have caused such problems. The most direct and measurable denial of care under PPS is the refusal by a PRO to preauthorize an admission that a physician seeks. Evidence from a small sample of early 1986 refusals by the Connecticut PRO showed that: 1) the proportion of direct refusals was small (less than one percent); and 2) the delay or denial of care that resulted from those refusals had no severe morbidity effects for the patients involved (Imperiale, Siegal, et al., 1988).[83] While this evidence fails to document any major access difficulties resulting from PRO reviews, it is only a small sample for one state in one short time period. A larger, more representative sample could yield different results. In any event, the question remains as to whether the sentinel effects of the PROs--rather than the PROs' direct actions--might lead the hospitals themselves inappropriately to deny some admissions. There is little published evidence to address any of these PRO-related issues more definitively.

This sketch of the admissions effects of PPS is partial, but it fairly portrays the general findings of published research to date. The general message here is positive. PPS does not appear to have increased financial barriers to care, nor does PPS appear to have had a significant effect on hospital closures, to the point that access to care would be materially affected. At the same time, it is difficult to find a general or systematic access problem in the declines in admissions that occurred through the early years of PPS.

If the published literature provides reassurance that PPS has not systematically denied access to appropriate inpatient care, it nonetheless raises certain important cautions about how PPS may affect access for select groups of patients and for certain types of admissions. These cautions may increase in importance as hospital margins continue to decline. Meanwhile, the sources of reassurance on the access issue are relatively simple measures. More discriminating data and

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[82]Note that the data we have that show little in the way of a systematic access problem are drawn largely from the first three or four years of PPS at most, leaving open to question what has happened in the late 1980s, as hospital margins narrowed and the instances of marginal losses from an admission likely increased.

[83]However, some patients in the sample studied by Imperiale et al. did have "minor problems" that their physicians believed would have been avoided by immediate admission--e.g., such problems as patient anxiety and uncertainty, the expense and inconvenience of multiple hospital or office visits, lost work time of family members, and the need to obtain home health care.

methods might raise more serious questions. Accordingly, there is no basis for extreme confidence on questions of access; there is instead a tentative reassurance that major problems--problems large and systematic enough to register on the measures used to date--have been avoided.

B. Quality-Related Outcome Measures

Beyond questions of access to care lie questions concerning the quality of care--particularly, though not exclusively, inpatient care--that beneficiaries do receive. Published studies of the quality of care under PPS fall into two broad groups: 1) studies that review changes in certain quality-related outcome measures, such as mortality, readmission, transfer, and emergency room admission statistics; and 2) studies that appraise other attributes of care, including processes of care, patient stability at the time of discharge, and other suggestive indicators. We will address each group of studies in turn, beginning in this section with the studies devoted to quality-related outcome measures.

The outcome measures that these studies use are relatively simple and remote. As all researchers acknowledge, the measures do not tell us exactly what may be remiss in the health care beneficiaries receive, nor do the measures record any unnecessary suffering or hardship that may be caused by PPS--except as that suffering or hardship results in one of the (relatively extreme) outcomes measured. Quality would have to change in critical or substantial ways to affect these measures, so that a deterioration in these measures after PPS would represent particularly powerful, negative evidence. We review studies of four measures below: mortality, readmissions, transfers, and emergency room admissions.

1. Mortality

Tables 7A and 7B summarize results from published studies on the effects of PPS on the mortality of beneficiaries. Four different kinds of mortality rates are considered in this research: mortality rates for hospital patients, for nursing home patients, for patients longer term after a hospital stay, and for the general elderly population in the community. Each of these rates explores a different possible effect of PPS on mortality. First, acute hospital mortality rates--the percentage of short-term hospital stays ending in death--were unchanged or declined after PPS. (See Table 7A.) Even studies of small samples generally fail to find an increase in hospital mortality rates (e.g., Fitzgerald, et al., 1988; Flynn, O'Daniel, et al., 1990; Gerety, Soderholm-Diffate, and Winograd, 1989; Mayer-Oakes, Oye, et al., 1988; and Simons and Omundsen, 1988). Meanwhile, some large-sample studies find decreases in hospital mortality rates, typically after adjusting for the severity of patient illness (e.g., Kahn, Keeler, et al., 1990, which uses medical record data to adjust the rates for variations in sickness at admission; Long, Chesney, et al., 1987, which uses a body system count to adjust for severity of illness; and Manton, Vertrees, and Wrigley, 1990, which does not adjust for severity, but stratifies its sample into chronically disabled community residents, nondisabled community residents, and institutionalized persons). While these results are superficially reassuring, there are important complexities to take into account (Russell, 1989). If quality of care were unchanged under PPS, hospital mortality rates

TABLE 7A.
THE EFFECT OF PPS ON MORTALITY RATES:
IN-HOSPITAL RATES AND LONGER-TERM RATES

MORTALITY MEASURE	STUDY (First Author[a], Year)	TIME PERIOD	EFFECT ON MORTALITY RATES: DECREASE	NO CHANGE	INCREASE
In-Hospital Mortality	DesHarnais, 1987	1980 - 1984		X	
	DesHarnais, 1988	1980 - 1985		X	
	Fitzgerald, 1988**	1981 - 1986		X	
	Flynn, 1990**	1979 - 1989		X	
	Gay, 1989*	1981, 1984		X	
	Gerety, 1989**	1982 - 1986		X	
	Kahn/RAND, 1990	1981-82, 1985-86	X		
	Long, 1987	1980 - 1984	X		
	Long, 1989	1980 - 1984		X	
	Mayer-Oakes, 1988**	1981-82, 1984-85		X	
	Manton/Liu, 1990	1982, 1984		X	
	Manton/Vertrees, 1990	1982, 1984	X		
	Sager, 1987*	1982 - 1985	X		
	Sager, 1989	1981 - 1985	X		
	Simons, 1988**	1981-82, 1984-85		X	
Longer-Term Mortality After Hospital Stay	Eggers, 1987 (6 weeks)	1968 - 1984		X	
	Fitzgerald, 1988** (12 mos.)	1981 - 1986		X	
	Gerety, 1989** (12 mos.)	1982 - 1986		X	
	Kahn/RAND, 1990 – (30 days)	1981-82, 1985-86	X		
	– (180 days)	1981-82, 1985-86		X	
	Leibson, 1990** (30 days)	1980, 1985, 1987		X	
	Mayer-Oakes, 1988** (6 mos.)	1981-82, 1984-85		X	
	Ray, 1990* (12 mos.)	1981-83, 1984-86		X	

[a] Second author or other information noted, when helpful or necessary to identify the article. In addition, longer-term mortality measures noted for articles that include such measures.

* Statewide sample.
** Small/select sample, typically of a single hospital.

TABLE 7B.
THE EFFECT OF PPS ON MORTALITY RATES:
NURSING HOME RATES AND POPULATION RATES

MORTALITY MEASURE	STUDY (First Author,[a] Year)	TIME PERIOD	EFFECT ON MORTALITY RATES: DECREASE	NO CHANGE	INCREASE
Nursing Home Mortality	Carroll, 1987**	1982-83, 1984-85		X	
	Carroll, 1990**	1982-83, 1985-86		X	
	Lewis, 1987**	1980, 1982-83, 1984		X	
	Lyles, 1986**	1982 - 1984			X
	Manton/Liu, 1990	1982, 1984		X	
	Manton/Vertrees, 1990	1982, 1984	X		
	Sager, 1987*	1982 - 1985			X
	Sager, 1989	1981 - 1985			X
Population Mortality	Eggers, 1987	1968 - 1984		X	
	Hadley, 1988	1970, 1980, 1982, 1985			X
	Lindberg, 1989	1970 - 1987			X
	Manton/Vertrees, 1990	1982, 1984	X		
	Russell (1989)	1970 - 1986		X	

[a] Second author or other information noted, when helpful or necessary to identify the article.

* Statewide sample.
** Small/select sample, typically of a single hospital.

could still increase, since admissions declines disproportionately diverted patients whose conditions were not life-threatening (e.g., patients needing cataract surgery).[84] At the same time, however, shorter hospital stays under PPS reduce the probability that a terminally ill patient will be in the hospital to die. The net effect of these opposing tendencies is difficult to predict, so that it is difficult to establish a clear standard against which to compare the results (in particular, any unadjusted results) we observe. The best way to handle this problem is to consider other, more complete measures of mortality, as below.

Second, mortality rates for elderly or Medicare nursing home patients reveal particularly interesting variations. (See Table 7B.) Some studies find no change in nursing home mortality rates after PPS: e.g., Carroll and Erwin's studies of samples of nursing homes in Georgia (1987) and Pennsylvania (1990); and Lewis, Leake, et al.'s (1987) study of a sample of nursing homes in southern California. However, studies by Sager et al. examine mortality data for the elderly population in Wisconsin (1987) and nationwide (1989) and find evidence that PPS has been accompanied by a change in the location of death, from the hospital to nursing homes: mortality rates in nursing homes increase after PPS, while hospital rates decline or remain unchanged, suggesting that PPS lead hospitals to discharge terminally ill patients to nursing homes for their final days. (Lyles, 1986, finds a similar increase in nursing home death rates for a sample of Portland, Oregon, nursing homes.) Manton, Vertrees, and Wrigley (1990) construct life tables from National Long Term Care Survey data and find a decline in hospital, home health, and nursing home death rates, with an increase in death rates outside Medicare services in the community. The results of these studies are not entirely consistent, but do suggest that some of the deaths that would have occurred in the hospital before PPS now occur elsewhere.

Third, the results on hospital and nursing home mortality rates lead naturally to the question of whether overall death rates have changed after PPS, irrespective of location. One measure that addresses this question is mortality within specified, longer-term periods following discharge from a short-term acute hospital. Studies we reviewed present mortality rates for periods ranging from 30 days to one year after hospital discharge. (See Table 7A.) All but one study find no significant change in mortality rates after PPS. Kahn, Keeler, et al. (1990) is the exception: this is the only study based on a national sample (for five disease groups) that directly adjusts mortality rates (30- and 180-day) for severity of illness at admission.[85] The study finds a one percentage point decline in the 30-day rate after PPS, while the 180-day rate is essentially unchanged. Given that these studies measure deaths over relatively long periods of time after a hospital stay and ignore where the deaths happen to occur, they might pick up PPS effects that are only partially captured in any one setting--but they do so at the possible cost of introducing even more complex confounding variation. The fact that none of the studies finds an increase in

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[84] As noted, the large-sample studies that find a decline in hospital mortality generally have performed some adjustment for severity of illness or patient type (e.g., Kahn, Keeler, et al., 1990).

[85] Eggers (1987) estimates mortality rates within six weeks of a hospital admission. His results do not adjust for changes in the severity of illness of patients; but Eggers makes an approximate adjustment by changing the denominator of the mortality statistic: from the number of hospitalizations to the number of beneficiaries. He finds no significant change in mortality in the first year of PPS.

longer term mortality rates after hospitalization is important evidence, as they provide a crude measure of the possible overall effect of hospitalization.

Finally, one set of studies looks at a more indirect measure: population mortality statistics. (See Table 7B.) This measure tracks deaths for all elders, not only those elders with a recent hospital stay. Comparison of national mortality rates from NCHS data across a few select years (1970, 1980, 1982 and 1985) shows a substantial decrease in rates the 1970s, but little change (or, for certain age cohorts, an increase) since 1982 (Hadley, 1988). However, national comparisons across all of the years in extended series from pre- to post-PPS periods reach a different conclusion: the PPS year(s) in the series do not depart from the pre-PPS trend. For example, Manton, Vertrees, and Wrigley (1990) find that age-specific mortality trends declined significantly and continuously over the limited period 1980 to 1986. Eggers (1987) uses NCHS mortality data for the 1968-1984 period and finds 1984 mortality rates to be within chance fluctuations around predicted rates, as estimated from two different specifications of a linear time trend model.[86] Russell (1989) reviews variations in mortality rates from 1970-1986 for all elders and for separate age groups and finds little evidence for reduced improvement in the rates once PPS (or TEFRA) was implemented. Russell (Ibid.) also reports results of regression analyses of death rates between 1970 and 1985: 1) for all people aged 65 or older, and 2) separately for five-year age/sex cohorts.[87] The "strongest results" from these analyses show a break (reduction) in the trend in 1979, not later. Moreover, these analyses show no difference in effects when the most vulnerable, the very old, are considered: for example, breaks in 1982 (TEFRA) and 1983 (PPS) were not significant for men or women aged 85 and older.

These national mortality statistics thus show little change in elderly population mortality with the introduction of PPS. However, it is important to emphasize (as most of these researchers do) that several more years of data will be required before we can be certain that particular fluctuations in the PPS or TEFRA years were not the small antecedents to a more discernible change in trend. At the same time, these national statistics may mask local variations that show stronger, more worrisome relationships between PPS and mortality. Lindberg, Lurie, et al. (1989) examine age-adjusted mortality rates for Hennepin County, Minnesota, for the period 1970-1987. These authors find that mortality rates declined steadily from 1970-1982, but ceased to fall thereafter, making death rates in each of four PPS years in the data (1984-1987) higher than the projection. During these PPS years, inpatient hospital days for the county's elderly population fell substantially in Hennepin County, as elsewhere. Results such as these suggest a possible causal link of fundamental importance. Although the authors do not explicitly assert that that causal link exists, other reports on this study (e.g., Cotton, 1988) do imply as much. However, as Vladeck (1989) notes in a thoughtful comment, the connection between PPS, hospitalization rates, and elderly mortality is a complex one--among other reasons because other

[86]Both of Eggers' specifications assume a change in the trend of mortality statistics--to a lower rate of decline--in the 1970s. One specification assumes the shift occurred in 1976; the other assumes the change occurred in 1979. In either case, the actual 1984 mortality rate was within the 95% confidence interval for the prediction; in the second specification, the actual value was lower than the predicted value.

[87]The results for all elders are from a HCFA study (HCFA, 1987), the age/sex specific regressions are from Russell's own unpublished work.

payers than Medicare had a larger decline in hospital utilization and PPS itself actually encouraged rather than discouraged hospital admissions. Vladeck suggests that either hospitals reacted irrationally to PPS, "or that their behavior was not primarily dominated by PPS incentives" (p. 1478).[88] In addition to Vladeck's cautions, there is an important methodological question in the Lindberg et al. study. The authors assume there was no change in the trend of mortality rates before PPS: they fit a single regression line to the 1970-1982 data and use that line to estimate expected non-PPS rates for the PPS years. Unlike Eggers (1987) and Russell (1989), Lindberg et al. do not test for a possible change in trend in earlier years.[89] The effect of finding an earlier break well before PPS would be to predict higher mortality rates for PPS years, which in turn would reduce or eliminate any deviation of PPS actuals from the projections.[90]

Notwithstanding their extensive differences, all of the above studies evaluate the effects of PPS on mortality rates in roughly the same way: by comparing pre- and post-PPS rates. A slightly different issue is raised if, instead of looking at comparisons of pre- and post-PPS mortality rates, we compare variations in mortality rates to variations in the level of generosity of PPS reimbursement. One unpublished study (Cutler, 1991) finds a small, but significant, average price effect on hospital mortality. However, all of the change is in the timing of early deaths, not in the long-run mortality hazard: that is, in diagnoses with price reductions, some deaths that used to occur in the first six months post-hospitalization now occur in the hospital; but given survival to six months, there is virtually no increased probability of death following changes in average prices. A second unpublished study (Staiger and Gaumer, 1990) examines the relationship between a hospital's financial condition in the previous year and 45-day mortality rates for urgent care conditions judged to be sensitive to pressures to contain costs. No relationship exists for the majority of urgent-care admissions (i.e., admissions to large hospitals); however, a small, but significant and robust, relationship was found for small hospitals (less than 150 beds) and government-owned hospitals. These studies suggest that it is not only the structure, but also the generosity, of PPS rates that contributes to their ultimate impact on the quality of care. The Cutler study suggests as well that this effect influences the timing, but not the longer run rate, of mortality. (The data for the Staiger and Gaumer study did not permit the authors to test this proposition.)

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Studies using hospital, nursing home, longer term/post hospital, and population mortality statistics do suggest some potentially important changes after PPS--notably, a shift in the location of death, in at least some samples. However, this research generally fails to document any significant change in mortality statistics from which it might be implied that PPS has reduced the

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[88]In this context, Vladeck does not consider the possible influence of the PROs on hospital behavior.

[89]For example, Russell found a significant break in 1979, while breaks in 1982 and 1983 were not significant.

[90]In this light, the comment by Lindberg, et al. (p. 1484) is puzzling: "We have selected 1983 as a break point because of the major policy changes instituted that year. Even if the break in trend had actually begun in an earlier year, our findings of significant deviations in 1984-1987 would still hold." In fact, however, those findings of significant deviations would not necessarily hold if the break in trend had begun in an earlier year such as 1979 and resulted (as it did for Russell and for others) in higher projected mortality rates for PPS years.

quality of care that Medicare or elderly patients receive. As with possible access problems, discussed earlier, the effects of PPS on mortality rates are not so large or systematic as to vindicate the worst fears when PPS was implemented.

That overall result may simply reflect the crudity of the mortality rate construct as a device to record any deterioration in the quality of care. Most of the research to date has been devoted to pre/post comparisons of mortality rates. Recent, unpublished work suggests the possibility of small, subtle relationships <u>within</u> the framework of PPS reimbursement, particularly concerning changes in the generosity of PPS rates. In an era of declining hospital margins, further exploration of such effects gains in importance, as against the pre/post comparisons that have dominated the first wave of PPS research.

2. <u>Readmissions</u>

A second set of outcome measures that have been used to evaluate quality of care under PPS is readmission statistics. Russell (1989, p. 53) notes:

> Readmission to the hospital shortly after discharge may... indicate that care during the first stay was deficient in some way--not only because the patient might have been discharged too early, but because incomplete or inept treatment during the first stay lead to a relapse.

Measures of readmission typically examine different windows of time after hospital discharge. <u>A priori</u>, we would expect at least a slight increase in post-PPS admissions rates, given the greater severity of illness in the population of inpatients. However, studies in this area suggest that readmission rates generally have not changed, although there are some state and local samples that have found increases. Specifically:

- Studies based on national samples find either no significant change in readmissions rates (Desharnais, et al., 1987, 1988b; Guterman, Eggers, et al., 1988; Kahn, Keeler, et al., 1990; and Lave, Frank, et al., 1988b)[91] or a decline (ProPAC, 1990). The latter study shows that 30-day readmission rates for Medicare patients in acute hospitals increased from 1984-1986, but the rate of increase was slightly below the pre-PPS average. Then, from 1986-1988, there was a reversal of the trend: the rate of increase was negative, and the readmission rate declined below the 1984 level.[92] Across hospital types, rural and small urban hospitals had lower readmission rates in 1988 than in 1984; but large urban hospitals had slightly higher

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[91]Note that two of the listed studies are focused on specific conditions rather than Medicare admissions generally: Kahn et al., which analyzes admissions for five diseases; and Lave et al., which analyzes psychiatric admissions (to exempt units, non-exempt units, and scatterbeds).

[92]This decline may in part be attributable to the activities of the PROs--the PROs have been directed by HCFA to pay close attention to readmissions (e.g., Russell, 1989). According to data reported by PROPAC for part of 1987, readmissions constituted approximately one-third of all PRO retrospective reviews, by far the largest single category of cases reviewed (PROPAC, 1988). Note that retrospective reviews were, in turn, almost 90% of all PRO reviews, with preadmission reviews constituting the balance.

rates in 1988 (ProPAC, 1990). Across age groups, only beneficiaries 90 and older had higher readmission rates in 1988 than in 1984 (Ibid.).

- Most state and local samples agree with the national statistics and fail to find a significant increase in readmissions rates (e.g., Carroll and Erwin, 1990; Gerety, Soderholm-Diffatte, and Winograd, 1989; Lewis, Leake, et al., 1987; Rich and Freedland, 1988; and Epstein, Bogen, et al., 1991). But there are exceptions (Carroll and Erwin (1990), a study of 10 long-term care facilities in Pennsylvania for 12-month periods beginning in mid-1982 and mid-1985; and Gay, et al. (1989, 1990), a study of discharges from short-term acute hospitals in South Carolina for the years 1981 and 1984). The latter study found that the category of admissions thought to be almost entirely composed of readmissions increased from less than 1% in 1981 to over 12% in 1984. Meanwhile, certain single-hospital studies (e.g., Flynn, O'Daniel, et al., 1990; and Weinberger, Ault, and Vinicor, 1988) revealed increases in readmissions rates, but the increases were not significant, at least in part because the samples of patients were small.

Apart from the exceptional cases noted, published studies on readmissions rates fail to detect any major change associated with PPS. Indeed, the study with the latest data (ProPAC, 1990, which has data through 1988) reports an actual decline in readmissions rates in the later years of PPS. Inevitably, a few studies reach different results, and those studies serve to raise a caution: for some samples of patients and hospitals, and for some pre/post comparisons, readmissions rates do appear to have increased. But the exceptions are narrow, especially in view of the probability that--other things being equal--readmission rates would have increased after PPS due to the decline in admissions and the more severely ill inpatient population. The relative consistency of research results on readmissions argues against any inference that hospitals systematically changed their patterns of care in ways that increased readmissions.

3. <u>Transfers</u>

Transfers present a somewhat different problem than readmissions--potentially, a problem of cost control rather than of quality of care. In principle, hospitals could use transfers to improve quality, by transferring a patient to a better-equipped or otherwise more appropriate setting. However, hospitals also could use transfers for financial advantage even when against the best interests of the patient: e.g., simply to avoid costly patients, and/or to shift the patients into a setting exempt from PPS. Indeed, fears that costly patients would be "dumped" by hospitals were a major concern when PPS was instituted. While there is little data to discriminate between appropriate transfers and transfers motivated by financial advantage alone, any major increase in transfers after PPS raises at least the suspicion of financial motivation and of possible quality consequences.

The studies in this area based on large, national samples tend to find little change in transfer rates. Three sets of studies based on national samples of CPHA hospitals reach similar results. One set of studies finds no significant change in the rate of transfers to other short-term hospitals or to exempt hospitals/units in 1984 (DesHarnais, Kobrinski, et al., 1987) or in 1984

and 1985 (DesHarnais, Chesney, and Fleming, 1988b), although the nominal transfer rates generally do increase. Studies by Long, Chesney, et al. (1987, 1989) generally find no increase or only a "slight" increase in transfers to other short-term hospitals in 1984, versus 1980-1983. Finally, a study by Sloan, Morrisey, and Valvona (1988a) finds a "very small" increase in the proportion of patients transferred to or received from other hospitals from 1983 to 1985. One study done on non-CPHA data reaches a similar result: Gay, et al. (1989, 1990) examine sources of admission for South Carolina hospitals in 1981 and 1984 and find only a "slight" increase in the rate of admissions from other hospitals. By contrast, a study of transfers of elderly veterans to three Department of Veterans Affairs (VA) hospitals from non-VA hospitals suggests an increase in such transfers between 1982 and 1984 (Hurley, Linz, and Swint, 1990); however, the distribution of such transfers across "problem" (unprofitable) and other DRGs fails to reveal evidence of financial motivation.[93]

These studies generally imply that the rate of transfers did not substantially change after the introduction of PPS, although the VA data suggest a need for some caution. Moreover, these studies are all based on data no later than 1985. There is some evidence to indicate that rates of transfer increased thereafter: ProPAC (1990) shows that transfer rates increased only 2.6% annually from 1984-1986, but then increased by 9% annually from 1986-1988. Coincidentally, this latter period was a time when hospital margins began to be squeezed, after the more generous early years of PPS.[94] ProPAC (Ibid., p.78) concedes the acceleration in transfer rates is a possible problem that "... is not completely understood and warrants further investigation." It therefore appears that no final judgment on the issue of transfer rates is possible, pending careful analysis of the more recent trend. Standing alone, the simple fact of accelerating transfer rates raises the possibility of the kind of financial opportunism that was feared under PPS.

4. Emergency Room Admissions

The final quality-related outcome measure to be considered is emergency room (ER) admissions. An increase in emergency room admissions could occur for many different reasons, but some of the possibilities have troubling implications for the quality of care: e.g., stricter criteria for admission under PPS could mean more delays in admission until emergency conditions arise. Unfortunately, there is little available evidence on this issue. Data for 1980-1985 from a sample of CPHA hospitals show an increase in the proportion of emergency room admissions for Medicare patients in 1984 and, particularly, 1985 (Sloan, Morrisey, and Valvona, 1988a).[95] A corresponding increase in ER admissions for non-Medicare patients generally did not occur,

[93] Examining discharge patterns from the three VA hospitals, however, Hurley and his colleagues found evidence that the care of elderly veteran patients in problem DRGs was being shifted to VA hospitals: apparently not via the mechanism of transfers after admissions, but by diversion of patients to VA hospitals before a non-VA admission.

[94] See the discussion of hospital finances in Chapter I.

[95] Within the CPHA sample studied by Sloan et al., the percent of Medicare admissions through the ER increased only slightly between 1980 and 1983 (from 35% to 36%), but then increased one percentage point in 1984 (to 37%) and four percentage points in 1985 (to 41%).

suggesting that there was something peculiar to Medicare admissions causing the increase. However, there was no indication that treatment of these ER admissions was more resource intensive compared to other admissions. Meanwhile, although the very old (aged 85 and older) constituted a larger share of ER admissions in 1985 than previously, the proportion of readmissions within the ER admissions group actually declined. Given these mixed indications, the authors of this study suggest the need for further investigation of the issue.

Studies by Gay et al. (1989, 1990) for South Carolina hospital admissions reach a contrary result: between 1981 and 1984 (the two years reported), ER admissions declined by more than one-third (from 34% to 22%) for short-term acute care hospitals in the state. Obviously, this contrary result could simply be due to state-specific factors in South Carolina that yield a different pattern of ER use than found in the national sample of CPHA hospitals used by Sloan et al.. Alternatively, there may be idiosyncracies in the coding or definitions of the state data source the Gay study used (or, for that matter, in the CPHA data that the Sloan study used) that account for at least some of the difference.

Whatever the reasons for the difference, it is clear that the published data conflict and that too little is known about the trend of ER admissions under PPS to offer any strong conclusions. The work of Sloan and colleagues on a national sample suggests that there may indeed have been a problem, while the work of Gay and colleagues implies the contrary result for one state. In any event, since these studies cover only one or two years of PPS, we could say little about the lasting effect of PPS, even if we were more certain about the initial impacts.

5. Quality-Related Outcome Measures: Conclusion

The purpose of research on quality-related outcome measures is to search for indications that the quality of care deteriorated under PPS, to an extent sufficient to register on these relatively coarse variables. In general, these studies fail to document any significant change, from which it might be implied that such a deterioration occurred. Mortality statistics and readmissions rates do not appear to have changed substantially. Transfer rates changed little in the early years of PPS, although there may have been a more substantial change in later years. The few studies of ER admissions are inconclusive. The net implication: it is still possible to make the statement that (in terms of these outcome measures) there has been no documented deterioration in the quality of care under PPS. However, it is important to add to that blanket statement that little is known about the relationship of these outcome variables to quality of care and that little has been carefully documented for the past four or five years of PPS. In other words, the general level of comfort this literature provides is based on (at most) one-half of the time hospitals have spent under PPS--and it is the first and more profitable half of these hospitals' PPS experience. We know little about the behavior of hospitals under more stringent PPS reimbursement. Given these limitations in the research, and given some suggestions that later trends are more troubling (notably, as implied in the data on transfers), there is no reason to assume that the questions addressed by this literature have been definitively settled.

C. Clinical Measures of Morbidity and the Process of Care

To this point in our review, we have discussed two broad categories of literature on the effects of PPS on quality: studies concerning beneficiary access to care and quality-related outcomes of care. In this section, we discuss a final body of literature, concerned with clinical measures of morbidity and the process of care. This latter body of literature is diverse. It also contains some of the most thought-provoking of all the literature on the quality of patient care under PPS. The studies in this area are distinctive in that:

- they are typically based on medical records rather than claims data or discharge abstracts.

- they are typically based on small samples of patients presenting with one, or at most a small number of, conditions (e.g., hip fracture patients in a single hospital).[96]

- they often include such outcome measures as mortality and readmissions, but in each case join those measures to other, finer-grained indicators of the condition or treatment of patients (e.g., the performance or failure to perform indicated tests and treatment, the number of physical therapy sessions administered, and stability or ambulatory capability at discharge).

- they sometimes encompass a more complete episode of patient care, thereby permitting a more complete exploration of the effects of PPS on quality among hospital, post-hospital, and other care.

Given these distinctive features, studies in this area can offer relatively discriminating hypotheses about selective aspects of hospital and other care. These studies move the concern about the quality effects of PPS from relatively remote indices like mortality to questions about actual processes of care and patient discharge. As we will see, that change of focus is a particularly productive one.

Our review of this literature will be organized according to groups of clinical measures. The reason for considering certain clinical measures together is to permit considering certain findings of these studies together: the significance of certain of these studies rests not on any single finding, but rather on a composite of findings that depict larger sequences of care. The result is a relatively rich set of stories on the quality of care under PPS, stories that are both instructive and often cautionary.

1. The Hip Fracture Studies: The Process of Care, Stability at Discharge, and Long-Term Nursing Home Residence

[96]However, the most important single study in this area--the RAND study of the quality of care--is based on a large, national sample for five disease conditions.

One set of studies focuses ultimately on changes in the ambulatory status of patients at discharge and the longer-term residence of discharged patients in nursing homes. The best known of these studies take pre- and post-PPS samples of hip fracture patients, and the results are provocative.

This line of work was begun by Fitzgerald and his colleagues (1987, 1988), who studied hip fracture patients aged 65 or older admitted from the community to a 430-bed teaching hospital in Indianapolis (1981-1985) and an 1100-bed community hospital in a large midwestern city (1981-1986). In the Indianapolis study (1987), there was no change in the severity of illness of the patients, pre- versus post-PPS. Lengths of stay declined substantially (almost 40%), without any significant increase in mortality rates (in-hospital or six month). However, the average number of physical therapy sessions per patient declined by half.[97] Data suggested that patients may have had lower ambulatory capacity at discharge. In any event, the proportion of patients discharged to nursing homes (all SNFs) more than doubled (48% post-PPS, versus 21% pre-PPS), and the proportion of patients still in the nursing home six months later was <u>three times as large</u> (39% post-PPS versus 13% pre-PPS). These results suggested a potentially powerful critique of the effects of PPS on quality: 1) patients were being discharged to nursing homes sooner, after less physical therapy, in poorer condition (in terms of suggestive measures of ambulatory capacity); <u>and</u> 2) the capacity of the nursing homes to rehabilitate these less ambulatory patients appeared questionable. The combination of hospital and post-hospital care seemed in this case to serve patients less effectively after PPS--and to do so with a pattern of care (shorter length of stay, less physical therapy) that was consistent with the incentives of PPS.

Fitzgerald et al.'s (1988) replication of this study in the large midwestern community hospital reached similar results for the pattern of hospital care, except that there was a lesser decline in the number of physical therapy sessions and a significant increase in the rate of physical therapy sessions per postoperative day. While the indicators for physical therapy were thus more promising, the outcomes were similar to those in the first study: an insignificant change in mortality rates (in-hospital and one-year), lower ambulatory capacity at discharge after PPS (using more reliable measures than in the first study), a significant increase in discharge to skilled nursing homes (38% pre-PPS, 60% post-PPS), and a much higher percentage of patients in the nursing home, in this case after one year (9% pre-PPS versus 33% post-PPS). Direct measures of the characteristics of the nursing homes (including rehabilitation and nursing staff) showed little change after PPS.

Some of the most interesting results in this second study concern a post-PPS comparison of patients belonging to HMOs, versus all other patients (no one in the pre-PPS cohort belonged to HMOs). HMO patients had similar demographic and clinical characteristics to the rest of the post-PPS sample, except for race. But the HMO patients had much shorter hospital stays (almost one-half as long), and fewer inpatient physical therapy sessions (one-half as many). Moreover, the proportion of HMO patients who could walk at discharge was one-half as large, and those that could walk averaged a shorter distance. Finally, perhaps because of these treatment and discharge indicators, a much larger proportion of the HMO patients was discharged to skilled nursing homes

[97]The nominal rate of physical therapy sessions per day for the post-operative, physical therapy phase of the hospital stay declined only slightly, from .85/day before PPS to .82/day after.

(83% of the HMO patients, versus 55% of the other post-PPS patients). However, notwithstanding these less promising indicators on treatment and discharge, there was no difference between the cohorts in hospital and long-term mortality, and a much smaller proportion of the HMO patients were in the nursing home one year later (16% of HMO patients, versus 35% of the other post-PPS patients). Controlling for the effect of race had no effect on the observed differences in outcomes. While there are many potential explanations for these HMO findings, and while the comparison of HMO patient outcomes to the outcomes of other patients is notably risky, one possibility is that "... a reimbursement mechanism offering incentives for efficient and effective care <u>in both inpatient and outpatient settings</u> may yield better outcomes" (Fitzgerald et al., 1988, p. 1396, emphasis added). PPS only offers incentives for efficient hospital care. Indeed, PPS poses the risk that the hospital will suboptimize the hospital component of the complete episode of care, with no single entity responsible for reconciling how the different parts of the episode are managed (note the discussion in Russell, 1989). That kind of suboptimization presents a potentially serious quality problem to the patients in the Fitzgerald samples--and a notably serious cost problem as well to Medicare and other payers.[98]

Other researchers have extended the promising line of inquiry that Fitzgerald and his colleagues began:

- Palmer, Saywell, et al. (1989) replicated the Fitzgerald study design for a sample of patients admitted from the community to a private, 663-bed, non-profit hospital in Indianapolis (1981-1987). The Palmer study found a relatively small decline in length of stay after PPS (24%),[99] and a relatively small decline in the number (but an increase in the rate) of physical therapy sessions. However, Palmer found no significant change in: 1) ambulatory status at discharge or six months; 2) the rate of discharge to nursing homes; or 3) the proportion of patients remaining in nursing homes after six months. The authors suggest that the difference between these results and the Fitzgerald results may be due to different staffing and practice patterns at the Palmer hospital (fewer inexperienced residents) or to the lower percentage of indigent patients in the Palmer study. The contrasting results suggest to the authors the need for studies using larger samples.

- Gerety, Soderholm-Difatte, and Winograd (1989) examined a sample of hip fracture patients at the Stanford University Medical Center (1982-1986). They found slight, but significant, declines in length of stay (11%) and discharge ambulation; and a slight increase in discharge rate to nursing homes. But no differences were found in mortality, the rate of hospital readmissions, 12-month ambulatory status, or 12-month nursing home residence. Indeed, it appeared that <u>differences in ambulation and nursing home residence after one year were related not to the implementation of PPS, but rather to the specific nursing home to which the patient was discharged</u>--patients discharged to a nursing home that functioned (pre- and post-

[98]Based on rough cost calculations, Fitzgerald et al. (1987) find that the costs of lengthier nursing home stays more than offset the savings from shorter inpatient stays.

[99]The 24% decline in length of stay is small relative to the 40% decline found in both Fitzgerald studies.

PPS) as a geriatric rehabilitation facility were more likely after one year to return home or to a lower level of care and more likely to ambulate independently, by comparison to patients discharged to other nursing homes. As with the Fitzgerald data on HMOs, this latter finding of Gerety et al. suggests that an important part of the quality of care these hip fracture patients receive depends on the post-hospital phase of the hip fracture episode--and in this case depended specifically on fortuitous admission to a particularly effective rehabilitation setting.

Two studies using larger samples provide some perspective on the questions raised by these hospital-specific studies. First, Ray, Griffin, and Baugh (1990) studied a 20% sample of elderly Michigan Medicare enrollees with hip fractures (1981-1983 and 1984-1986). They found a 23% average reduction in length of stay after PPS, with no change in mortality rates (up to one year) even for the subset of hospitals with the largest reduction in stays. Moreover, for the subset of enrollees who were dually entitled (Medicare/Medicaid) but not in an institution prior to hospitalization, there was no increase in the rate of Medicaid-covered nursing home residence one year after hospitalization.

Second, the major RAND study of the quality of patient care examined medical records and other data for five diseases for a nationally representative sample of elderly Medicare patients (1981-1982 and 1985-1986). One of the five diseases was hip fracture. This study developed explicit criteria and scales for appraising the quality of care (Kahn, Rogers, et al., 1990) and performed a structured implicit review of the care as well (Rubenstein, Kahn, et al., 1990). In addition, it developed clinical measures for the instability of patients at discharge (Kosecoff, Kahn, et al., 1990). For hip fracture patients, the study found a significant decline in the average length of stay (almost 30%), accompanied by an improvement after PPS in: 1) the average score on explicit process quality measures, and 2) the implicit judgments of quality.[100] Meanwhile, there was a significant increase in the proportion of all hip fracture patients unstable at discharge, but no significant increase for the subset of hip fracture patients discharged to an institution. There was a decline in hospital, 30-day, or 180-day mortality rates.[101] Finally, for a subsample of patients in three states, this study found only a small and insignificant increase in the proportion of patients in nursing homes six months following admission. In sum, with respect to hip fracture cases, the RAND study provides an unusual array of measures for a large, national sample of patients. The study finds no significant change (or an improvement) in those measures for all but the measures of stability at discharge.

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[100]An improvement in the implicit judgments of reviewers was represented by a decline in the proportion of patients judged to have received poor or very poor care. Later in this chapter (see Section C.3), we will discuss the RAND results on explicit and implicit measures of hospital care for all five diseases RAND studied.

[101]The decline in 30-day mortality rates was not significant. Note that--by contrast to the four medical diseases studied--the improvements in the explicit process indices for hip fractures were not significantly related to mortality measures. The RAND study authors speculate that the absence of a significant relationship for hip fractures may be due to the fact that death is a rare outcome for this condition, as opposed to the other four diseases; or that mortality is not the best outcome to study for hip fracture patients; or that the medical record does not provide adequate data for evaluating surgical, particularly intraoperative, processes.

In all, six published studies review the quality effects of PPS on hip fracture patients. Four of those studies (including both of the large-sample studies, by RAND and Ray et al.) reach findings that are basically consistent: they find little or no evidence of a deterioration in the quality of care after PPS was introduced. The question then becomes what to make of the less sanguine findings of Fitzgerald and his colleagues. Four principal conclusions are warranted:

1. The Fitzgerald studies examined two hospitals that may simply have been different than the norm (on which point, see Palmer, Saywell, et al., 1990). However, for all hospitals, there is little in PPS to prevent or discourage the pattern of reduced hospital care and prolonged nursing home stays that the Fitzgerald studies observed.[102] Indeed, PPS financial incentives tend to encourage precisely this pattern. For a change as fundamental as PPS, it would be a mistake to expect that all hospitals will resist this encouragement. It is accordingly important to look at more than the average or aggregate effects of PPS. The Fitzgerald studies provide a caution about the reassuring norm and a suggestion of the kinds of questions that would be useful to answer to identify subpopulations of hospitals and patients experiencing similar problems.

2. Studies of quality-related outcomes (see discussion in the preceding section) are a necessary form of scorekeeping on PPS--these studies provide a reassurance that there has not been a large, consistent decline in the quality of patient care. However, without more, these outcomes cannot tell us much about the determinants of quality care. The principal virtue of the hip fracture studies is to move thinking about the quality of care away from a focus on outcome indicators alone, toward a concern for a more completely described process of care, where a more productive quality discussion may be had (note the discussion in Russell, 1989). For example, the second Fitzgerald study found tentative evidence that the management of care across a more complete episode of care by HMOs seemed distinctly to improve the outcomes for hip fracture patients. The Gerety study found that one nursing home devoted to geriatric rehabilitation appeared more effective than its counterparts (pre- and post-PPS), in terms of how quickly its patients were rehabilitated. The RAND study (Kosecoff, Kahn, et al., 1990) found an increase in the proportion of unstable patients discharged to home, and a connection between that instability and mortality rates. In each case, these studies explore relationships between processes and outcomes of care, in a manner that permits formulation of hypotheses on concrete operational issues: notably, such issues as discharge planning and the management of post-hospital care for different kinds of patients. These issues would be important to improve the quality of patient care even in the absence of PPS.

3. Variations in finer-grained quality measures (e.g., explicit and implicit measures of the process of care) frequently have a significant relationship to mortality, as the RAND studies in particular have shown. However, the relationship is not uniform-

[102]PROs do some retrospective sampling to appraise whether discharges have been premature (e.g., see ProPAC, 1988).

-it appears weak for hip fracture patients, as noted earlier--and the absence of a change in mortality statistics does not mean that there are no significant changes in quality for at least some subpopulations. Note that none of the hip fracture studies found a significant change in hospital or post-hospital mortality after PPS, even when (as in the Fitzgerald, Gerety, and RAND studies) finer-grained evidence suggested that other quality problems might be present.

If the hip fracture studies thus provide some reassurance on how PPS has affected quality, they also point to a set of concerns about possible deficiencies in the process of care in some settings and possible risks presented by the incentives of PPS. Other studies based on clinical indicators will serve to make a similar set of points.

2. "Quicker and Sicker": The Presence of Greater Instability or Impairment at Discharge

The hip fracture studies reviewed above generally found PPS associated with a decline in the ambulatory status (or, in the RAND studies, an increase in the instability) of patients at discharge. These changes were sometimes associated with an apparent deterioration in other outcome measures (e.g., long-term nursing home residence, in the Fitzgerald studies), but the large-sample studies by RAND and Ray found little or no deterioration in these other measures.

The question of instability or impairment at discharge has been addressed for other conditions than hip fractures, including:

1. Patients admitted with acute myocardial infarction, cerebrovascular accident, congestive heart failure, and pneumonia--The RAND study sampled patients with these four medical conditions, in addition to the hip fracture patients discussed earlier. The study found an increase in the proportion of patients discharged in unstable condition for all four conditions, with the largest increases generally occurring for patients discharged home (Kosecoff, Kahn, et al., 1990).[103] Moreover, for all five diseases studied, RAND found that patients discharged with at least one instability had a higher probability of dying post-discharge than patients without any instability (although, as noted earlier, RAND did not find any increase in mortality post-PPS for the complete sample of patients). The increase in the instability of patients at discharge has occurred across the board and is not limited to any specific patient or hospital subgroup, nor does it occur simply as an artifact of changes in how patient records are coded. These findings are corroborated by selected evidence that the burden of care on relatives and family members has increased following the introduction of PPS.[104]

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[103] Institutions did not receive a significantly greater proportion of unstable patients: 22% pre-PPS versus 23% post-PPS (these summary percentages include hip fracture patients as well as patients with the other four diseases sampled by RAND).

[104] For example, Fischer and Eustis, 1989, interviewed hospital staff, elderly patients, and family caregivers at a Minneapolis hospital before and after PPS (i.e., 1982 and 1986). They found that family responsibilities had increased after PPS, both quantitatively (a larger proportion of recuperation time) and qualitatively (more intense

2. Patients discharged from medical intensive care units (MICUs)-- Changes in the impairment of patients at discharge from MICUs could be due to a shift of care within larger hospital episodes (more care being performed after and outside the MICU stay); but such changes could also imply the rationing of expensive care for severely ill patients. Mayer-Oakes, Oye, et al. (1988) studied a sample of Medicare patients (aged 65 and older) and non-Medicare patients (aged 50 to 64) admitted to medical intensive care units in three California community hospitals (1981-1982 and 1984-1985). In a pre/post PPS comparison, this study found little significant change in the type of patient admitted to the MICUs, or in the condition of the patients at discharge from the MICUs (Acute Physiology Scores at discharge did not change significantly). If PPS reduced quality of care for the patients in this sample, the reduction occurred outside the MICU stay.

3. Patients admitted to post-hospital care--One way to appraise the impairment of patients at discharge from hospitals is to look at the other side of the discharge and examine the impairment of patients at admission to post-hospital care. A focus on post-hospital care admissions provides only a partial view of all hospital discharges--and a biased view as well, insofar as the mix of patients discharged to post-hospital care changes after PPS.[105] The impairment of patients at admission to post-hospital care is discussed in detail in Section C.2 of Chapter II, as part of the more general discussion of post-hospital practice patterns. As noted in that discussion, the studies of severity of illness of post-hospital admissions are typically based on small or select populations and do not typically control for changes in patient mixes after PPS. In any event, the results of these studies are inconsistent: changes in the severity of illness at admission to post-hospital care are not so large or systematic as to emerge from all samples or through all measures of severity, but are important in some samples and measures. It is accordingly difficult to reach any strong conclusions from these studies of post-hospital measures about the stability of patients at hospital discharge.

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The most direct and comprehensive of the studies described above is the RAND study, which finds important evidence that patients are discharged sicker (and quicker) from hospitals after PPS. Other, less comprehensive studies bear less directly on the issue of instability or impairment at discharge and typically reach inconsistent or inconclusive results. If we conclude that more patients are indeed unstable at discharge, the question becomes whether that fact alone represents a quality problem, or merely reflects the results of some less provocative process: e.g., a change in the division of labor for hospital episodes, with more care being delivered after the hospital stay. While recognizing appropriate limitations on their results and insisting that any implications be carefully drawn, the RAND authors suggest that there are reasons to be concerned, especially

care).

[105]To capture the effects of PPS on conditions at hospital discharge, any pre/post comparison of impairments at post-hospital admission should control for presenting conditions at the beginning of the hospital episode. Otherwise, the comparison will reflect differences in who is admitted to hospitals and who is discharged to post-hospital care, thereby confounding any inferences about the extent and quality of care delivered in the hospital.

as the cost-containment pressures of PPS intensify.[106] In particular, the RAND study notes (Rogers, Draper, et al., 1990, p. 1993):

> ... entirely eliminating discharges of patients in unstable condition (not just the effect after the introduction of the PPS) might have a large impact on the effectiveness of hospital care. For the five diseases studied, patients in unstable condition at discharge after the introduction of the PPS have a mortality rate 30% higher than that of patients discharged in stable condition. This translates into additional mortality of 4.4 percentage points in the 90 days following admission for patients in unstable condition at discharge. An observational study such as [the RAND study] cannot definitely estimate the effects of better discharge monitoring on patient outcomes; a controlled experiment with specific discharge protocols is required.

Thus, instability at discharge may reduce the effectiveness of hospital care. For this reason, the increase in instability associated with PPS is worrisome--as is the proportion of instability before PPS. There is a suggestion here that (as with some of the hip fracture results) the quality of care before PPS was not necessarily optimal, and that PPS may have made the problem somewhat worse. It is interesting that the consequences of unstable discharges may not have been fully appreciated before PPS, since hospitals at that time had a financial incentive to keep patients longer than necessary. Indeed, the elimination of this incentive was one of the principal justifications for PPS. One possible implication is that--even with the pre-PPS financial incentive for extended stays--there was a lack of knowledge about appropriate protocols for timing and planning discharges and a tendency in some cases to discharge patients inappropriately.[107] It is obviously difficult for hospitals and physicians to make appropriate choices on the discharge of patients when the benefits and costs of alternatives are not well documented. In the absence of rigorous discharge protocols (as from the clinical trials that the RAND authors urge), one suspects that hospitals will be less aware of the costs of unstable discharges and, with the advent of PPS, less equipped to resist pressures to economize.

3. Explicit and Implicit Measures of the Process of Care

One way to appraise the quality of care after PPS is to focus on what occurs within the hospital stay itself. A number of studies provide descriptive estimates of pre/post differences in such measures as the percentage of inpatient stays with one or more consultations (e.g., DesHarnais, Chesney, and Fleming, 1988b) or the number of physician visits per hospital stay (e.g., Mitchell, Wedig, and Cromwell, 1989). But to use measures of inpatient treatment to

[106]The data for the RAND study end in 1986, thus leaving open to question what changes have occurred since that time, as hospital margins have generally tightened.

[107]Discharges could be inappropriate because they were premature or for other reasons--e.g., because the discharge destination was not well-equipped to meet the patients' needs. It is useful in this context to recall the hip fracture study of Gerety et al. (1989), which found that one nursing home destination was far more effective than others in rehabilitating patients. More careful discharge planning may require, most of all, better targeting of destinations and better management of cases after discharge, rather than longer stays in the hospital.

appraise the quality of care, there must be some way to judge these measures (and any changes in them) against normative criteria, such as judgments about sound clinical practice or tests of effects on important outcomes (e.g., mortality). To establish these normative criteria requires a rich body of data (usually, among other things, medical records). There are accordingly few studies that explore these measures with any rigor. Our earlier discussion of the hip fracture studies provides an overview of the largest single line of research employing explicit and implicit measures of care linked to normative criteria on the quality of treatment and/or patient outcomes. But the research in this area extends beyond hip fracture patients to other areas. In this section, we will review these other studies.

One study which warrants further discussion is the RAND study, which, as noted earlier, applied explicit and implicit measures of the quality of care to patients in a national sample of hospitals. The study focused on patients with four diseases in addition to hip fracture: acute myocardial infarction, cerebrovascular accident, congestive heart failure, and pneumonia. Explicit criteria and scales for appraising the quality of inpatient care were developed in consultation with disease-specific panels of clinical experts; these criteria were then applied to patients in the sample using clinical judgment (Kahn, Rogers, et al., 1990). Nurse and physician reviewers performed a structured implicit review of the quality of care (Rubenstein, Kahn, et al., 1990). The explicit and implicit reviews were tested against patient mortalities. These tests revealed significant relationships between explicit and implicit measures of quality and patient mortality, thereby documenting the vailidity of the normative criteria being applied to the patient records.[108]

The application of these tests to patient records revealed that <u>implicit and explicit processes of care had improved after PPS</u>. Rural, non-teaching hospitals showed the greatest process improvements, while urban, teaching hospitals showed the smallest gains (Rogers, Draper, et al., 1990). There were no consistent differences in process improvement by patient type (e.g., age, gender, or race). While PPS did not appear specifically to have encouraged this overall improvement in process quality--process quality tended to improve over time prior to PPS--it could at least be said that PPS had not prevented it. These results suggested that compliance with standards of good practice could have an important impact on patient outcomes and that PPS had not undermined evolutionary improvements in such compliance.

Apart from the RAND study and the hip fracture studies already discussed, few other studies apply normative criteria directly to measurements of the processes of care. All of these studies are of small samples of patients, typically with a single condition. Examples include:

- Simons and Omundsen (1988) examined elderly pneumonia patients hospitalized at Hershey Medical Center in Pennsylvania before PPS (1981-1982) and after PPS (1984-1985). The study found no significant differences in age, severity of illness, in-hospital mortality, or mean length of stay between the two groups (the latter

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[108]The process-outcome relationship was reported separately by disease for the explicit measures; and there was a significant relationship between the explicit measures and 30-day mortality for all diseases except hip fractures. (See our earlier discussion of the RAND hip fracture results, in Section C.1 of this chapter.) For the implicit measures of care, reported results were pooled together for all diseases; and very poor quality of care was associated with increased rates of 30-day mortality.

being the most unusual result of the study).[109] Following a structured review of the process of care for these patients, the study was unable to detect any difference between pre- and post-PPS groups, in terms of the number of processes that were not followed or were omitted.

- Weinberger, Ault, and Vinicor (1988) examined two, 12-month cohorts of patients (1981 and 1983-1984) admitted and discharged to a county-owned hospital in Indianapolis with a diagnosis of uncomplicated diabetes mellitus. The study found a reduction in a number of different measures of care after PPS (e.g., in the amount of laboratory testing). But the study focuses on the reduction that occurred in inpatient consultations/education--a "cornerstone" of adequate care for patients with diabetes. While there was an increase in the frequency of post-hospital clinic visits by the patients after PPS, these visits did not appear to have been effectively used for patient education: the post-PPS group used emergency rooms more frequently, had more frequent readmissions, and had worse glycemic control. The authors conclude (p. 81): "Clearly, merely increasing the frequency of clinic visits did not compensate sufficiently for diminished inpatient education."

- Flynn, O'Daniel, et al. (1990) studied 280 patients who underwent neck dissections over a 10-year period (1979-1989) at a Louisville, Kentucky, hospital. The study found no significant differences after the introduction of PPS in the severity of patient conditions, in post-operative complications, or in post-operative mortality.[110]

- Van Hoesen and Eriksen (1990) examined the quality of nursing care for a small sample of cardiovascular surgery patients in a large, non-profit, teaching hospital one year before and one year after the introduction of PPS. The study found no significant change in patient acuity and a significant improvement in the quality of nursing care, as measured using quality-monitoring scales for different aspects of nursing care. However, there is no control in the study for any pre-PPS trend in the quality of nursing care (as appeared important in the process measures of the RAND study), so it is difficult to know whether PPS was somehow responsible for--or merely failed to impede--the observed improvement in nursing care.

These small-scale studies are consistent with the findings of the RAND study, in that they generally fail to find any notable decline in the processes of patient care after PPS. The principal exception is the Weinberger study, which finds evidence that reductions in patient education after PPS may be related to worsened glycemic control in diabetes patients. The ultimate implication of this research is similar to other areas of research on the effects of PPS on quality: most of the

[109] By way of comparison, mean length of stay declined significantly--from 12.1 to 10.4 days--for elderly pneumonia patients in the RAND study (Kahn, Keeler, et al., 1990).

[110] It is not clear from the study whether the measures of post-operative mortality take into account the reduced lengths of stay after PPS.

evidence fails to reveal any significant, measurable problem in quality, although there is some evidence to suggest the existence of selective or isolated negative effects.

D. The Effects of PPS on the Quality of Care: Conclusion

PPS has been associated with substantial effects on the practice and financing of health care for Medicare beneficiaries. Virtually all of these effects could reduce the quality of care that beneficiaries receive. To take a conspicuous example, large reductions in admissions and lengths of stay under PPS could reflect more cost-effective medical practice--or insufficient access and insufficient treatment for those who get into the hospital. The literature on the quality of care under PPS provides an essential normative check on PPS effects such as these, effects that, standing alone, repeatedly raise the specter of possible harm to beneficiaries. We are now in a position to summarize what this varied literature has found.

At the outset, it is important to emphasize that any conclusions we have on PPS and the quality of care are based on the experience of the initial years of PPS. More recent experience is unknown, since published studies are based on data that rarely extend beyond 1986 or 1987. The problem here is suggested by some data we do have for later years: basic transfer statistics for the late 1980s suggest a substantial and unexplained increase in the rate of transfers from short-term acute hospitals after 1986 (ProPAC, 1990). If sustained by more detailed analysis, this change in trend would raise new questions about hospitals' adjustments to PPS and the implications for patient care.

In the analysis of any fundamental change like PPS, it is necessary to be cautious about possible changes in effects that may occur in later years. But there is a particularly important reason for caution in the case of PPS: hospitals' margins were relatively large in the early years of PPS, during the period covered by most published studies. The tightening financial circumstances that hospitals have more recently faced could induce new adaptations by hospitals that more seriously compromise patient care. This threat suggests the need for continued monitoring of the effects of PPS on quality, quite apart from the other reasons for further research set forth below.

With that caveat in mind, we can set forth three basic conclusions from our review of the published literature examining the effects of PPS on quality.

1. In studies published to date, the negative effects of PPS on quality are not so large and consistent as to register on commonly accepted measures of major patient outcomes.

Perhaps the most important finding of the literature published to date is simply that commonly accepted forms of scorekeeping fail to record negative changes following the introduction of PPS. Published measures of access are generally reassuring, with little indication that hospitalization is being indiscriminately denied. At the same time, measures of mortality, readmissions, transfers, and emergency room admissions rarely reveal any significant negative

change following the introduction of PPS. To be sure, all of the measures used for this purpose are relatively coarse; and the data for most of the studies do not cover any of the most recent years of PPS. However, the published studies provide at least a first-order reassurance that the worst case has been avoided: any negative effects of PPS on quality are not so large and consistent as to register on these measures. The question then becomes whether there are other, more subtle or occasional quality effects from PPS that are not picked up by these major outcome measures.

2. But there are some reports of negative quality effects, particularly concerning how care is managed at and after hospital discharge.

If the results on major patient outcomes are generally reassuring, other results raise occasional cautions and point to serious questions on patient care. Most important, the RAND study shows a systematic increase in the instability of patients at discharge; and a number of small-sample studies show similar declines in the conditions of patients at discharge and thereafter (e.g., the Fitzgerald hip fracture studies and the Weinberger study of diabetes patients).

Some of these results may be read as a standard caution that some areas (or some hospitals, or some patients) inevitably differ in important ways from the reassuring norm--and we should attempt to discern whether there are any systematic factors coinciding to cause the deviant cases. But the more pointed message of these studies is a message about the relationship of hospital care to complete episodes of patient illness. The RAND results urge careful research on discharge protocols and the management of discharged patients.[111] The Fitzgerald and Gerety results urge greater attention to how and where patients are rehabilitated from hip fracture surgery after their hospital stay. The Weinberger results urge a multifaceted effort to improve post-hospital, outpatient care for diabetes patients, given the reduced role that hospital care plays.

The impression one gets from this research is that, by reducing the hospital role in patient episodes, PPS has placed a premium on what happens after the hospital stay. <u>Yet these post-hospital caregivers--ranging from relatives at home to professional staff in skilled nursing facilities--have not been systematically drafted into a new regime: not by PPS, nor (it would appear) by hospitals</u>. What adjustments have occurred have been local and <u>ad hoc</u>. Perhaps a more explicit and strategic effort is required, especially in view of the next conclusion, which suggests the need for a larger context for understanding the quality problems this literature reveals.

3. The most compelling issues raised by this research certainly implicate PPS, but go well beyond it: to question the quality of care before, as well as after, PPS. In this context, PPS is a marginal factor, exacerbating certain weaknesses already present in the system of hospital and post-hospital care.

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[111]Note the analogous comments of Russell (1989), based on earlier studies.

While PPS appears strongly implicated in certain negative results this literature reveals. it is useful to shift the focus to a different question, concerning the level of quality independent of or before PPS. It is useful to recall that:

- The RAND study found an increase in patient instability at discharge after PPS (from 15% to 18% of all discharges), but also found that the relationship between instability at discharge and mortality was significant for pre-PPS cohorts as well as post-PPS cohorts. Discharge planning and the management of post-hospital care appear to have been a weak link in patient care before, as well as after, PPS.

- Within the post-PPS cohort of the second Fitzgerald study (1988), there was evidence that the rehabilitation of HMO patients was substantially faster and more complete (greater probability of returning home) than for non-HMO patients--notwithstanding that HMO patients left the hospital sooner, with lesser ambulatory capacity.[112] While comparisons between HMO and other patients are notably risky, the superior results for the HMO patients are possibly due to superior post-hospital case management (note Russell, 1989). This possibility suggests that certain opportunities for improving patient outcomes at discharge have not been systematically documented and explored, before or after PPS.

- In the Gerety study (1989), one nursing home that specialized in geriatric rehabilitation was able to rehabilitate patients much sooner than other facilities--before and after PPS. The superiority of this one facility did not appear to have been appreciated by the hospital, nor to have shaped how the hospital discharged patients, during the period covered by the study.

These data are only suggestive, but they sketch the outlines of a fundamental point. It was important before PPS, as well as after, that the different components of a complete episode of care support and complement each other, in order for the patient to receive effective care for an illness. But the appropriate division of labor between hospital and post-hospital care--and the appropriate management of their linkage--are difficult to specify from the available literature. These difficulties serve to emphasize important gaps in our understanding of what constitutes quality patient care. PPS has likely raised the stakes on this score: it is now more important to understand how best to mesh hospital and post-hospital care. <u>But the stakes were substantial in any event</u>. By making these issues more central to the politics of reimbursement, and by eliciting research on potential problems feared from the new reimbursement methodology, PPS has served to focus attention on opportunities for improvement in quality that may have existed all along.

[112]Note that there were no pre-PPS HMO patients in the Fitzgerald sample, so no pre-PPS comparison of HMO patients to others is possible.

CHAPTER VI.

CONCLUSION

The 1980s saw an energetic array of public and private initiatives to control health care costs, particularly the costs of hospitalization. The most significant single initiative was PPS. Like the state rate-setting programs it followed, PPS embodied a philosophy of incentive reimbursement: program savings were expected to result from providing opportunities for institutions to earn surpluses by competing successfully with, and providing services more economically than, other hospitals--or to suffer losses when they failed. These carrots and sticks were new: so long as hospitals had been reimbursed their costs, they faced few incentives to provide efficient care. Under cost reimbursement, there were no obvious reasons why all that could be done for patients would not be done. Under PPS, on the other hand, skeptics were concerned that the motive for surplus would lead hospitals to to do less for patients than what needed to be done. There was no way to know with certainty that hospitals and physicians would establish precisely the right balance between financial and clinical concerns. PPS, as supplemented by the reviews of the PROs, was open to many different possible results. Some of these possibilities rightly caused concern in the health care community--there were legitimate fears that patient care would be shortchanged in a regime where withholding tests and procedures would save the hospital money; that patients would be discharged too quickly, with unresolved problems left to fragmented post-hospital environments that (to the degree they were covered by Medicare) enjoyed greater reimbursement flexibility; that hospitals would dump patients with the prospect of unusually high costs for care, even as marginally necessary admissions were encouraged; and other fears. While some states and private payers had implemented prospective reimbursement well before Medicare joined the experiment, there were enough residual uncertainties in the state results--and enough distinctive characteristics in Medicare--to leave the outcomes of PPS in doubt. It appeared that many of the most important issues that PPS raised could only be answered with Medicare experience.

As we write, it is now eight years since Medicare's test began. Most of the initial questions have at least tentative answers, although the agenda of continuing issues remains imposing. Having surveyed the published literature on the effects of PPS, we are now in a position to summarize the judgment that that literature collectively provides. There are six principal implications to be drawn.

A. <u>We do know that administered prices can control hospital spending by providing payment incentives to control efficiency and intensity of services</u>.

Of course, this literature was not the first to point this out (see, for example, Coelen, Mennemeyer, and Kidder, 1986; and Schramm, 1987). Like state rate setting, PPS reduced expenses for hospitals by constraining payments; and on average, the control of expenses was less

successful in matching the constrained payment stream, resulting in reduced profits across the industry. And like state rate setting, there were early administrative errors in setting rates.[113]

Unlike the literature on state rate-setting, the literature on PPS fails to generate any reliable estimates of the expenditure (or payment) reductions that resulted, although several studies offer approximations ranging from 13%-16% of inflation rates (Feder, Hadley, and Zuckerman, 1987; Robinson and Luft, 1988) to \$10-\$18 billion by PPS5 (Coelen, 1991; Russell and Manning, 1989). These estimates are based on a number of different data sets. Though each provides a dubious point estimate of program effects, their general consistency provides some security beyond their specific methods.

There is still much disagreement about the underlying pattern of the effects. Some contend that the savings stem largely from a one-time savings in response to the incentives (e.g., Hadley, Zuckerman, and Feder, 1989, p. 362), while most others see a reduction in inflation rates. There is also disagreement about the extent to which the effects are driven mainly by admissions reductions (see Sloan, Morrisey, and Valvona, 1988b), or only partially so (in the range of 15%-30% of the total savings--see Russell, 1989; Hadley, Zuckerman, and Feder, 1989). In the case of state rate-setting, volume changes reduced the efficiency effects of cost containment payment incentives (Coelen, Mennemeyer, and Kidder, 1986). In the case of PPS, there is agreement that the volume incentives of a per case payment unit have not hampered savings to the Medicare program and may have extended the savings beyond those attributed to efficiency alone. Several papers argue that the economies of PPS have helped payers other than Medicare via spillovers (e.g., Coelen, 1991).

B. <u>This literature shows what did not happen: none of the worst fears raised at the outset have been borne out by experience studied to date</u>.

The literature on PPS contains a variety of qualifications and warnings. However, in terms of the overall effects of PPS, it is fair to say that none of the worst fears that were raised at the outset have been borne out by experience--at least, in the experience that has been studied to date. Admissions went down, not up; and the decline was selective and concentrated in procedures (e.g., cataract surgery) widely considered appropriate for diversion from the hospital. There is little evidence that hospitals have dumped patients, and evidence of only marginal shifts in admissions to exempt settings. Declines in the intensity of care appear selective, not relentless, and in any event appear not to have impeded long-term trends of improvement in the processes of care. Mortality rates and other indirect measures of the quality of care have not deteriorated. Worries that PPS would result in widespread cost shifting, retard the diffusion of new technology, or reduce uncompensated care appear to have been misplaced. In the bargain, Medicare appears to have saved a considerable amount of money, even as other public and private payers may have enjoyed substantial spillover benefits in the control of utilization; and the financial burden on Medicare beneficiaries has not been materially changed.

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[113]See early histories of New Jersey's DRG system and of the program in Western Pennsylvania, in Coelen, et al., 1986.

To be sure, there are some troubling signs in this research:

- PPS has not been financially neutral to the industry. While it is impossible to say if the general financial health of the industry is better or worse now than it was at the outset of PPS, it is obvious that, on average, hospitals have been unable to match constrained Medicare payment growth with corresponding reductions in expenditures. And there has been a noticeable decompression in financial well being across the industry: favoring large institutions and creating, at the other extreme, a group of chronically impoverished hospitals.

- There are signs of greater instability in patients at discharge and--an unfortunate complement--signs of poor discharge planning and management of post-hospital care. Notably, these are problems that predate PPS, but PPS seems to have exacerbated them.

At the same time, given difficulties of data and analysis or the absence of research, substantial open issues remain in certain areas. For example, no comprehensive evaluation has been done on the effects of the PROs; we only have conjectures to explain the major surprise of PPS (the decline in Medicare admissions in the first few years of PPS); little is known about the effects of PPS on certain exempt institutions and on clinical research; substantial uncertainties remain concerning such questions as the components of the casemix increase and the effects of PPS on nursing home utilization; and it is not certain that the pace of closures of small hospitals has not been due in part to the interaction of PROs, volume instability, and prospective per-case rates.

Thus, the record of PPS is not without gaps or important cautions. But it is a set of results that would generally have been welcomed by PPS proponents at the outset. It is surprising that so fundamental a change has failed to yield more fundamental conflicts in results--e.g., on major outcomes like mortality rates.

C. There is a growing body of evidence that cost containment results could still be stronger by moving rate setting policy toward equalizing pressure and away from trying to equalize payment rates.

Early work by researchers at Urban Institute and Georgetown University (Feder, Hadley, and Zuckerman, 1987) first noted that pressured facilities (potential losers against PPS rates) were more responsive to the PPS incentives; that the most favorable margins still accrued to the institutions that did the least to follow indicated marginal signals; and that more vigorous pressure on the institutions having low base-year costs (the least-pressured) might increase the savings and be more fair. Subsequent work by the same authors (Hadley, et al., 1989) confirms these points. Others confirm the pressure thesis (Robinson and Luft, 1988; Lave, 1990; and Zwanziger and Melnick, 1988). Recent work helps to confirm that convergence to adjusted national average spending and payment levels is a very sticky process, with "winners" retaining high margins and "losers" tending to lose even more over time (Cromwell and Burge, 1991; and Coelen, 1991). Local market factors appear to cause some institutions to persist in spending more (or less) against a fixed payment rate. This evidence, coupled with direct studies of the effectiveness of PPS

payment adjustors (Gianfrancesco, 1990; and Sheingold, 1986), indicates that payment pressure is not equalized across hospitals.

Improving and extending adjustments--or rebasing on a hospital-specific basis--would begin to equalize pressure and to create a fresh avenue to recover potential slack from institutions that otherwise are unpressured "winners." Indeed, the generation of excess PPS profits may have partially contributed to the renewed rise in hospital spending in the wake of the precipitous LOS drop. This latter point has not been studied, although Hadley, Zuckerman, and Feder (1989) and Cromwell and Burge (1991) do demonstrate that an industry of non-profit firms will tend to spend some portion of excess profits by elevating expenditures in subsequent years.

An obvious caution to the equal pressure thesis concerns the rates (and pressure) on high-cost institutions; if pressure is reduced, research clearly shows less will be saved in these institutions, where the gains of PPS have accrued to date. It is not possible to say if the effects from PPS would have been more or less pronounced if pressure had been equalized through hospital-based rates, rather than through national or blended rates. There is little question that the pattern of effects and the equities relating to margins would be different, possibly obviating the kinds of PPS policy changes (regarding rural hospitals, for example) that have absorbed so much time of policy makers in recent years.

D. Published research on the effects of PPS focuses on years when PPS was generally profitable to hospitals. This focus in time raises a fundamental question: to what extent has the generosity of PPS rates moderated reactions to the incentives of PPS rates?

Most published studies of the effects of PPS are based on data that runs to the third or fourth year of PPS at the latest--roughly half of the total PPS experience to date, and the more profitable half at that. The introduction of PPS provided a financial windfall to hospitals, by comparison to the TEFRA rates it replaced. The resulting surplus buffered the typical hospital against the costs of continuing activities that were unprofitable at the margin. In effect, the PPS intervention was an increase in, as well as a restructuring of, payments for the average hospital case. However, the debate on PPS focused on the marginal incentives PPS presented; and the literature appears to have followed that emphasis. Indeed, any reading of the PPS literature leaves one with the impression that only the marginal incentives changed--apart from the literature on hospital finances, most studies do not even bother to measure changes in average reimbursement.

We thus have a published literature on the profitable years of PPS, that addresses questions of incentives but generally ignores the role that generous rates may have played in the results we observe. If the relative generosity of rates remained constant over time, the failing would not be serious. But given the increasing stringency of PPS rates, we must necessarily be concerned as to whether the generally benign story to date will be revised in important ways when studies using later data are published. Indeed, the trends in margins, volumes, productivity measures, and other indicators are quite unstable in the first five years of PPS, no doubt reflecting behavior that anticipated and reacted to substantial changes in payments and practice patterns. At the outset of our review, we briefly summarized findings from studies of state prospective payment programs.

These state programs differ in important ways from Medicare PPS; but they provide a clue about the later years of PPS, in that these programs (e.g., in New York, Rhode Island, Maryland, and others) were not notably generous--and the results were far more mixed than we have observed for PPS. For example, we found in state rate-setting programs that reductions in expenditure growth of 2-4 percentage points per year could be sustained over more than a decade, with large cumulative effects on budgets; that large wage, FTE, and investment growth paths were substantially altered; and that important quality measures (urgent care mortality) might be adversely affected (Coelen, Mennemeyer, and Kidder, 1987; and Gaumer, Poggio, et al., 1989).

At the same time, certain findings in the PPS literature itself suggest the effects of relative stringency. Expenditure reductions were more pronounced, admissions declines were smaller, and length of stay reductions greater in hospitals facing greater fiscal pressure under PPS (Feder, Hadley, and Zuckerman, 1987). Moreover, generous Medicare payment rates at the outset led to more liberal spending by hospitals in subsequent periods (Hadley, Zuckerman, and Feder, 1989). Temporal variations in the generosity of PPS rates show a small, but significant, relationship to short-term mortality rates (Cutler, 1991; and Staiger and Gaumer, 1990). More generally, we have to anticipate that hospitals under greater financial pressure will become far more sensitive to activities unprofitable at the margin--to the point of restricting activities that were commonly maintained in the early years of PPS. Hospitals under financial pressure will almost certainly be less willing to care for high-risk patients, to underwrite additional tests when necessity is arguable, to acquire costly new technologies, or otherwise to act as a benign buffer between the signals PPS sends and the increasingly negative messages from their financial reports. All of these negative results were at least possible when PPS was originally implemented and are simply more likely now. The first wave of PPS softened the effects of prospective rates with generous payment levels--and the published literature on PPS is focused on those early years. The later years should show the effects of more ubiquitous financial pressure: the apparent effects of the incentives will be much stronger. Studies using data from the late 1980s should be closely followed to ascertain how much the declining generosity of PPS rates has mattered.

E. Data fragmentation and other data limitations have set important limits on what we can know about the effects of PPS--particularly concerning the effects across the boundaries between hospital and other forms of care, and between Medicare and other payers.

Research on health issues is pervasively affected by the limitations of available data bases. For studies of PPS, the limitations are serious, given that the ultimate reach of PPS effects cuts across so many different payers and provider types. It is a straightforward matter to study particular issues in the small: e.g., pre/post changes in admissions or lengths of stay at non-exempt short-stay hospitals. However, for these particular issues, it is difficult to be certain about how much care is leaking across institutional boundaries in ways that cannot be traced through existing data bases: e.g., between non-exempt and exempt facilities (note Newhouse and Byrne, 1988, and the difficulty of identifying exempt facilities in pre-PPS data), and Medicare and other payers (note Farley and Hogan, 1990, and the possible deflection of elderly veterans in unprofitable DRGs to VA hospitals). To the extent that particular statistics are affected by shifts of care to other settings, pre/post comparisons are biased in ways that are invisible to the

analyses. Statistical controls--e.g., for patient mix--certainly mitigate the problem, but are necessarily coarse in virtually all studies.

Meanwhile, a comprehensive estimation of the effects of PPS involves more than a list of changes in particular outcome statistics for inpatient care. Ideally, we would like to compare complete episodes of patient care before and after PPS, to track how the composition of episodes of care has changed for different kinds of patients (note Russell, 1989). But the construction of patient-level episodes is extremely difficult, in part because of the technical complexity and expense (e.g., in linking Part A and Part B claims data), and in part because Medicare is a relatively minor payer for key components of care that PPS has made more important (notably, extended nursing home care). Some data sources are more comprehensive than others for particular purposes (e.g., some data sources include discharge destination or clinical history, while others do not); and some studies have made substantial progress filling the gaps present in readily available sources--e.g., the combination of large-scale medical record abstraction and post-discharge data collection by the RAND quality of care study (Draper, Kahn, et al., 1990); and the linkage of Part A and B data bases by Mitchell her colleagues (Menke, 1990; and Mitchell, Wedig, and Cromwell, 1989). But no one has constructed complete pre/post episodes of patient care, and to that extent there are significant limits to our understanding of changes in the different components of care and in how they fit together after PPS.

F. <u>The results of PPS tend to exonerate the basic premises on which PPS was based. However, the results also suggest that we still do not fully understand the preferences and behavior of hospitals</u>.

Based on the literature to date, PPS appears to have saved Medicare money without causing systematic, documented harms to patients or the health care industry. These results tend to confirm the basic premise of the venture: that there was slack in the provision of inpatient hospital services, and that creating incentives for cost containment would squeeze some of the slack out of the system. Moreover, many of the ways that hospitals economized fit expectations for how they would behave: e.g., by reducing lengths of stay and shifting care to outpatient settings.

Having recognized these consistencies with original expectations, we should also recognize the limitations in our understandings of how the hospitals would react. First, the admissions decline was a surprise. The stylized facts used to explain it tend to be simplistic, and no one has rigorously documented why it occurred. Was it due entirely to PRO regulation (and associated sentinel effects)? To physician preferences to avoid the hassles of admission and continued-stay review? To better payment rates in the outpatient setting? To pure hospital preferences to substitute? We do not have the studies available to discriminate among the possibilities. Second, we do not know whether narrow reimbursement incentives of PPS--e.g., to cut back on tests or to forego purchases of new technology--were buffered by generous rate levels, hospital and physician commitments to quality care, preferences for institutional stability, the deterrent effects of reviews by the PROs, compelling marketing considerations, the need to retain physicians, or other concerns. <u>Indeed, given how little is known about how the PROs had their effects, we do not know whether financial carrots or regulatory sticks were the most important factors</u>

influencing key dimensions of hospital behavior. Third, we do not know how risk preferences vary among hospitals or how those preferences affected hospital adaptations to PPS. For example, PPS made hospitals liable for the full costs of care; while a large hospital could essentially self-insure for variations in patient needs and patient volumes, small hospitals may not have been able to do so. How much of what we see was driven by preferences for risk? Fourth, we do not have a good map of how hospitals actually administered all of the different changes that the PPS literature describes. A more detailed appraisal of the connection between hospital operations and PPS effects would give us a better understanding how hospitals generate and control costs.

G. Conclusion

In general, a review of the PPS literature serves to reassure us on most of the original concerns that accompanied implementation of the program. But reflection on this literature also points to a series of problems that were not central questions at the outset. For some of these latter problems--notably, the possible effects of the declining generosity of PPS rates--the passage of time should reveal whether or not the worry is misplaced, as studies using later data appear. Other problems will not be so naturally explored and will require instead a reconception of what the central questions should be, for understanding the behavior of hospitals and other providers, for creating equitable adjustments to behavior across the program's providers, for pursuing improvements in the quality of care, and others.

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